The OIL WEEKLY

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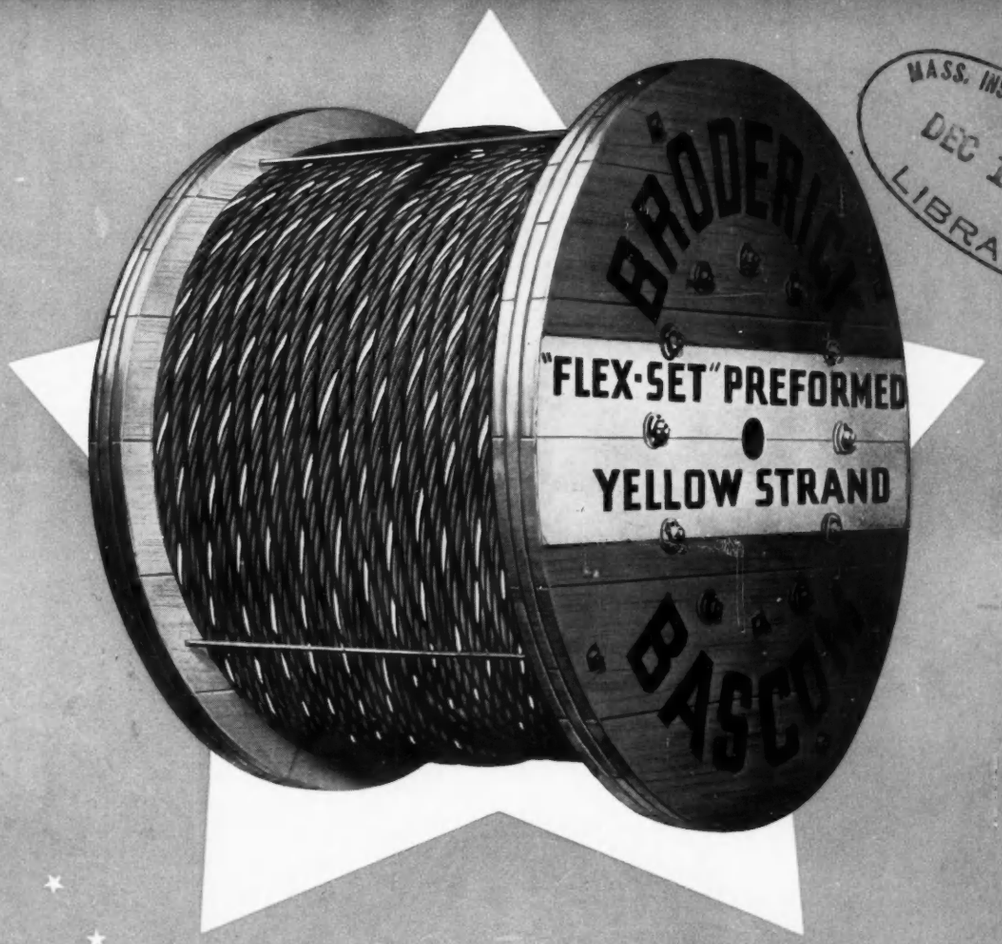

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*Reg. U. S. Pat. Off.

LONE STAR CEMENT CORPORATION

DALLAS - - - - - - - - - - - HOUSTON

General Heading: BAKER MODEL "K" CEMENT RETAINER

Unit No. A-19

Subject: Squeeze Cementing Shut Off Wet Zone

BAKER OIL TOOLS, INC.

Main Office and Factory:
6000 So. Boyle Ave., Box 127, Vernon Station, Los Angeles, Calif.
Central Division Office and Factory:
6023 Navigation Blvd., Box 3048, Houston, Texas
Export Sales Office:
19 Rector Street, New York, N. Y.

Index: 250.1
Date: December 7, 1942
Page: 1 of 1 p.

Squeeze cementing affords a safe, economical solution to many present-day well repair and well completion problems. Thousands of such jobs have been successfully performed with the Baker Model "K" Cement Retainer, which has long been a standard unit of equipment for accomplishing difficult as well as the usual run of squeeze cementing jobs.

Two such typical applications are described and illustrated below.

Today, with conservation of time and materials being of the utmost importance, it is essential that successful results be secured the first time . . . and the Baker Model "K" Cement Retainer has a reputation for obtaining a successful "first-time" job.

If you are not familiar with this device, you can secure complete details from any Baker office or field representative, or see pages 250-263 of the 1942 Baker or Composite Catalog.

Service Note
Competent Baker men will service, make suggestions, and otherwise assist in securing best possible results.

BAKER MODEL "K" CEMENT RETAINER APPLICATIONS

Recementing • Cementing Behind Sections of Pipe
Reducing Gas/Oil Ratios • Plugging Off Bottom Fluids
Plugging Back to Upper Zones
Testing Upper Cased Formations • Squeeze Jobs
Cementing Off to Perforate for Production
Cementing Bad Pipe • Cementing Two Strings Together
Cementing Low-Pressure Zones
Use of Cement Retainer as Casing Bridge Plug

JOB NO. 1

PROBLEM:

To shut off water entering from bottom of producing zone.

METHOD:

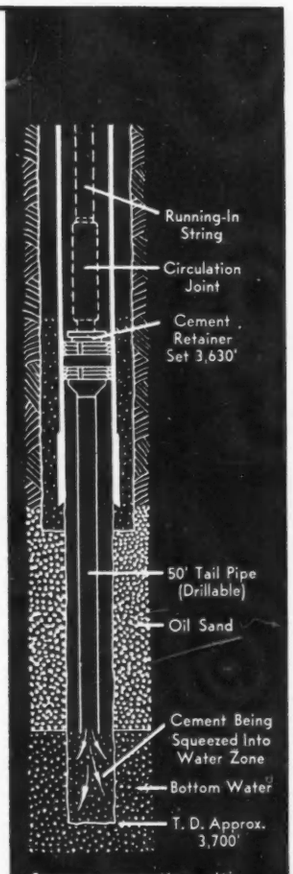
Squeeze cement with Baker Cement Retainer equipped with 50′ (drillable) Tail Pipe.

RESULT:

Water completely shut off (before performing squeeze, production was cutting 35% water).

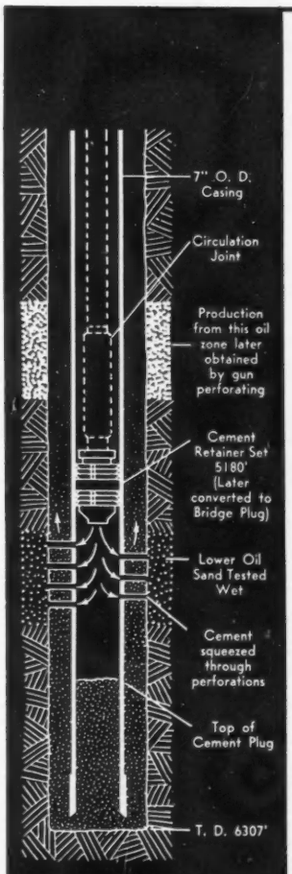
DETAILS:

Field: Kilgore, Texas
Depth of Well: 3700′
Depth Retainer Set: 3630′
Breakdown Pressure: 500 pounds
Final Pressure: 2100 pounds
Number of Sax Put Away: 534
How Cement Discharged: Through lower end of Tail Pipe into open hole.



Squeeze cementing with Baker Cement Retainer (with Tail Pipe) to shut off bottom water.

Prod. No. 400
Baker Model "K" Cement Retainer


7" O. D. Casing
Circulation Joint
Production from this oil zone later obtained by gun perforating
Cement Retainer Set 5180′ (Later converted to Bridge Plug)
Lower Oil Sand Tested Wet
Cement squeezed through perforations
Top of Cement Plug
T. D. 6307′

Squeezing Off Lower Wet Zone with Baker Cement Retainer

JOB NO. 2

PROBLEM:

To squeeze off lower wet sand and protect upper oil zone.

METHOD:

Perform squeeze cement job with Baker Cement Retainer and then convert Retainer to Casing Bridge Plug.

RESULT:

Wet zone completely shut off; upper zone produced with no water.

DETAILS:

Field: Golden Meadows, La.
Depth of Well: 6307′
Depth Retainer Set: 5180′
Breakdown pressure: 1400 pounds
Final Pressure: 2500 pounds
Quantity of Cement Mixed: 300 Sax
Number of Sax Put Away: 300
How Cement Discharged: Through Perforations

263040

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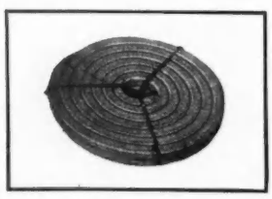
Do you have a copy of the R/M catalog? It's keyed for applications, illustrated, and indexed as to materials and types. Get a copy from your R/M distributor, or write us direct.



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LOOKING AHEAD

. . . with the Editor

Tanks Into Columns

THE oil industry, blocked by priorities and unprecedented shortages of new materials, is everywhere showing the ingenuity and resource which have contributed so largely to development of the industry's equipment and processes in the face of a swiftly growing demand for its products.

A natural-gasoline plant, source of highly desirable raw material for explosives manufacture, knew the material needed could be fractionated from its stream, if columns of sufficient height were made available. Against a government deadline of three months for initial delivery, the best promise of equipment manufacturers of fractionating-column delivery required six months, and then only if ample stock of new material was available for the fabrication.

As have so many other plants engaged in furnishing oil for military needs, this unit turned to the consideration of making the columns—of record-breaking height—from such second-hand material as could be made available.

The story of the fabrication of the two columns, by two lease-tank manufacturing plants never before having undertaken such a project, the utilization of 21-year old 55,000-barrel tank steel as column walls, and the development of technique for forming and welding the units in accordance with API-ASME code for pressure vessels will be told in a forthcoming issue. It is another page in the amazing history of the oil industry's adaptation to emergency demands and offers suggestions whereby other unusual and pressing needs may possibly be met without dipping deeply into the limited and circumscribed store of new materials. Bolted to concrete bases, the columns will be self-supporting, with sectional and readily interchangeable trays, and will be fabricated, transported and erected with a total outlay of less than one twelfth of the total cost of all new materials.

THE OIL WEEKLY, Published every Monday. Entered as second class mail matter December 23, 1916, at the post office at Houston, Texas, under act of March 3, 1879.

On a Sunday morning twelve months ago, America got out of bed and yawned and breakfasted, went to church and read the funnies or took a walk with the kids. We were a big, sleepy, good-natured people who only half believed that such things as war existed.

A few hours later we were awake. The thing that made us awake was treacherous and brutal, but the shock of it was as bracing as an icy shower. We knew, at last, where we stood and what we had to do.

THAT WAS A YEAR AGO...

YOU have a broad idea of what the nation has accomplished in this first year of war. We now report to you on what the men of one company have done and are doing.

Long before last December, "Caterpillar" Diesel Tractors and Motor Graders, Engines and Electric Sets were busy on what was then called "defense" work. With the country's entry into war, "Caterpillar" production was turned wholly to war purposes, and our plants, already working three shifts a day, stepped up their output of machines. Additional space was built. More workers were trained.

Throughout this crucial year, 100 per cent of this increased "Caterpillar" production has been going into the war effort — the vast majority of it directly to the *combat forces* of the Army, Navy and Marine Corps, and for our fighting allies. On all the world's battlefronts these machines are right in the thick of the struggle for freedom. "Caterpillar" Diesel equipment is clearing beachheads for attack troops, hauling big guns, building and repairing landing fields, drilling wells and pumping water. It is powering naval craft and generating current for lights and communications, afloat and ashore. But our report would be far from complete if it dealt only with combat activities. Here at home, thousands of older "Caterpillar" machines have been performing what appears to be a miracle. With no new machines coming from the factory to replace them — with fewer men to do the vital wartime jobs, and with heavier loads and longer hours a necessity — they have stood up under grueling punishment, month after month. In industry and construction, in mines and lumber camps and on the farms, "Caterpillar" Diesels are making a mighty contribution to the war effort.

They're no orphans — these tough, veteran machines. They are under able and expert guardianship. Back of their record of performance stand the "Caterpillar" dealers who have met the challenge of this emergency with energy and courage, and have shouldered full responsibility for keeping "Caterpillar" Diesel equipment doing its sturdy best.

With a large supply of replacement parts in their stock rooms, and with complete service facilities available night and day, "Caterpillar" dealers everywhere are pledged to keep "Caterpillar" Diesel Tractors, Graders, Engines and Electric Sets delivering all of the long life and rugged dependability that are built into them — until victory is won.

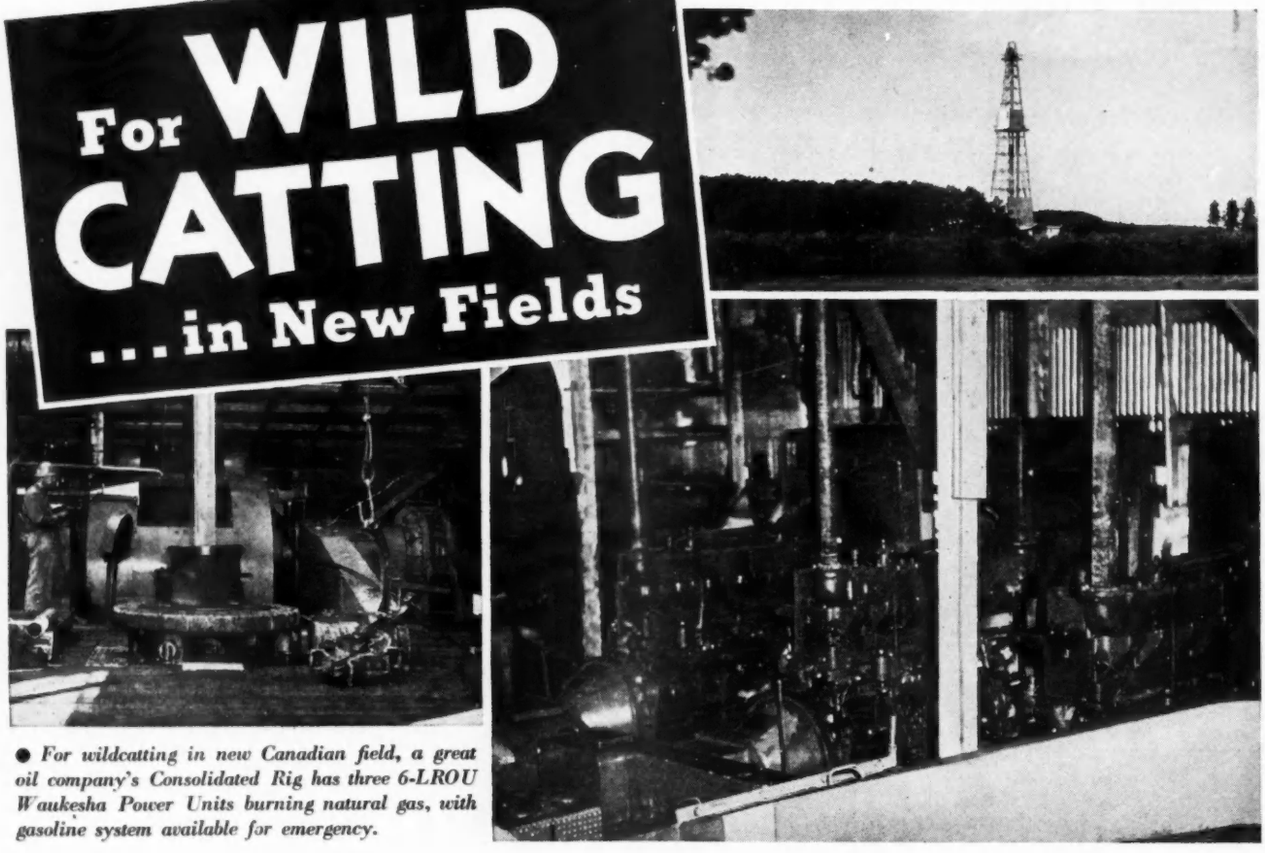
CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

TO WIN THE WAR: WORK—FIGHT—BUY U. S. WAR BONDS!

For WILD CATTING ...in New Fields



● *For wildcatting in new Canadian field, a great oil company's Consolidated Rig has three 6-LROU Waukesha Power Units burning natural gas, with gasoline system available for emergency.*

WAUKESHA *Oil Field* ENGINES

Convertible from Natural Gas to Gasoline ...without interrupting operations

★ Wildcatting in a new field—one of Canada's foot-hill regions noted for its consistently hard formations—these engines have drilled 2500 to 2600 ft. in what is expected to be an 11,000-ft. hole.

At least 250 to 400 bits will be used and six months to a year will be required, if this drilling project is completed as planned.

This oil company is using one of the best equipped, best rigged up mechanical power rigs of the larger type. It's an Ideal Type 125 Consolidated Rig, with three big Model 6-LROU Waukesha Oil Field Power Units, 8½" x 8½", 2894 cu. in. displ., developing 375 to 400 hp. *each.*

Coupled through hydraulic transmission to the mud pumps, rotary table and draw works, these Waukesha Engines give all the responsive smoothness, with fast flexible power, that deep drilling demands . . .

And more! These Waukesha Power Units burn natural gas. But, in new fields like this one, the supply of natural gas often runs short. It happened here. And butane wasn't available either. But these Waukeshas are *Multi-Fuel* Engines—with a gasoline system immediately available. Drilling went right on without interruption. *Get Waukesha Oil Field Engine Bulletin 1079.*

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THE OIL WEEKLY

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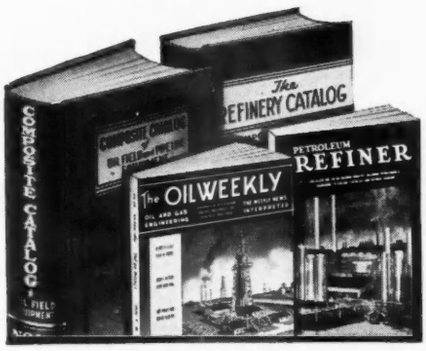

SPECIALIZED OIL JOURNALS
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The Oil Man's Calendar

DEC. 17	Petroleum Accountants Society of Oklahoma, Tulsa.
18–19	Interstate Oil Compact Commission, Oklahoma City.
FEB. 15–18	American Institute of Mining and Metallurgical Engineers, New York.
APR. 7– 9	American Association of Petroleum Geologists, Fort Worth, Texas.
8– 9	American Petroleum Institute, Eastern District, Pittsburgh.'

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CENSORSHIP NOTICE—Censorship rules occasionally make it necessary to tear out or otherwise delete parts of publications destined to subscribers outside the United States. If there be such deletions in copies of THE OIL WEEKLY going abroad, they are at the request of the Office of Censorship. Copies sent abroad face unavoidable delay because of time necessarily consumed in passing the publication through the Office of Censorship.—*The Publisher.*

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Safety

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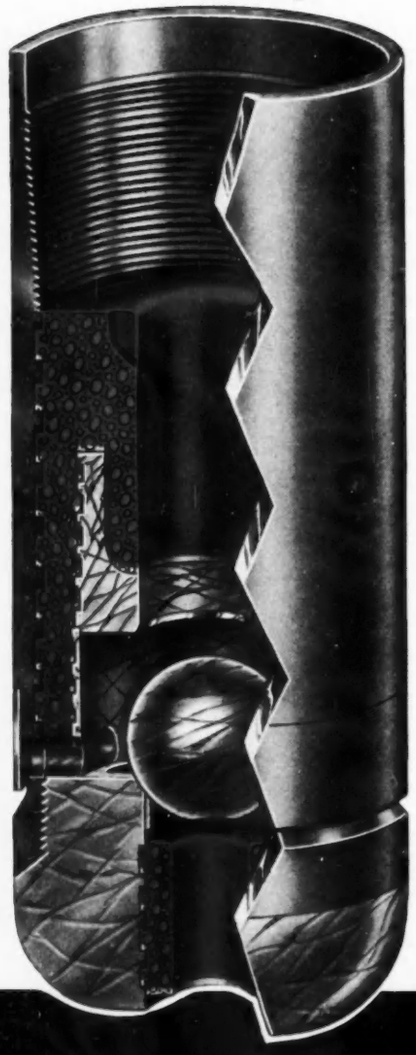
....for Deep Well Cementing Jobs



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LARKIN HAS CONSISTENTLY BUILT BETTER CEMENTING EQUIPMENT AT NO PREMIUM IN PRICE

The Changing Panorama

Ickes Appointment Brightens Outlook

THE broadened powers given Harold L. Ickes over operations of the oil industry brightens the outlook for petroleum.

While powers granted Ickes under the new order signed by the President December 2 (see page 9) are not all-inclusive, they are much better than the preceding setup. Much of the confusion that has surrounded the operations of the industry because a number of governmental agencies have had jurisdiction over its activities should be eliminated. While these agencies were not stripped of their powers, they were instructed to work with or under Ickes on matters pertaining to petroleum.

This holds out promise of better prices for crude oil and petroleum products, and a better distribution of needed critical materials required by the industry. The Administrator is known to feel that sagging crude reserves must be checked. Ickes' suggestion no longer can be ignored by the various other agencies.

His appointment and the creation of a Petroleum Administration for War also ends the fear that oil activities might be absorbed by WPB, and that someone unfamiliar with the peculiar characteristics of the industry might head the group. Thus the industry is assured of continuing to have a governmental agency composed of men from its own ranks, and headed by a cabinet member who understands its problems, importance and needs. Absorption of OPC by WPB probably would have eliminated all these advantages.

Furthermore, Ickes and the industry now are on mutual terms and hold a respectful regard for each other. This is important in carrying out the cooperative endeavors made necessary by the war. With each having the confidence and support of the other, the oil industry and Ickes will work together for the benefit of all.

Ickes Sees Many Problems Ahead

OIL HAS run "a turbulent course since last December—Tanker sinkings . . . East Coast transportation shortage . . . shutdown wells in the Southwest . . . nationwide rationing. As we enter another December, its future seems unavoidably destined to be even more uncertain." These words were used by Harold L. Ickes, petroleum coordinator, for his opening paragraph of a brief statement on oil's achievements for '42 and forecast of 1943 that appears in the January issue of the American Magazine.

Ickes' statement continues:

"In the minds of 27 million motorists, the paramount question is: 'When do we get more gasoline?' The answer can be given by no man, for, even when the rubber problem has been overcome, there is no way of knowing what new complication of war may have arisen.

"In the minds of 2,500,000 families whose homes are heated with oil, the more immediate question is: 'How much will we get this winter?' And this question, like the other, defies any definite answer, for it involves the unknown. How much can be done by railroad tank cars, already showing signs of deterioration under faster and more continuous movement than they were intended to sustain? How many tank ships will remain in commercial service—and how many of those will elude the submarines? How cold will the winter be? What will the weather — and possible wrecks and sabotage—do to our transportation system?

"At enormous expense, it has completely rebuilt its transportation system in order to move overland and by inland waterways the oil which, in peacetime, moves by tanker.

"It has increased its production of 100-octane aviation gasoline — a 'must' for our fighting planes and bombers—to a point far beyond what anyone, a year ago, had believed possible.

"It has produced the bunker oil that propels our ships, the high-octane gasoline and Diesel oil that run our tanks, the lubricants that keep these war machines operating smoothly, the industrial oil that fuels our war plants, the toluene for the TNT that has been blasting the enemy on three continents.

"By getting along without materials here and finding substitutes there, the industry freed precious steel and chromium and copper and aluminum for the weapons of our fighting men.

"I think that its attitude and its performance are well epitomized on a little card which was prepared by a New York oil man, a member of our Petroleum Industry War Council. It says:

"'THE DIFFICULT
we do immediately.
"'THE IMPOSSIBLE
takes a little longer.

"This is what Hitler calls 'decadent democracy,' If he doesn't mind, though, I'll place my faith in it."

WILLIAM S. FARISH

The death of William S. Farish removes from the scene one of the nation's most capable executives, and a man whose patriotic instincts were of the highest order.

Those who were fortunate enough to know him intimately will feel the keen loss of a friend whose friendship was unwavering.

Few men are given the opportunity of a world-wide grasp of petroleum affairs to the extent exercised by him.

Bedeviled during the past year by those who sought to make political capital of the international dealings which have already contributed greatly to the prosecution of the war, he allowed no criticism or bitterness to sway him from his conviction that the number one job of his company and the oil industry was to contribute everything possible to the winning of the war.

His loss is not simply the loss to his family, his friends, his organization—it is a loss to the nation.

—Ray L. Dudley, Publisher.

Statistics Proving This Is An Oil War

"THIS is an oil war," asserted Wm. P. Cole, Jr., in his highly respected letter to President Roosevelt, when the former congressman stepped out of the chairmanship of the petroleum subcommittee of the House committee on Interstate and Foreign Commerce. *"Whichever side best supplies its armed forces with proper petroleum products, when and were they are needed, and comes nearest to denying them to its enemies, when and where needed, will ultimately win."*

Replied the President: "The crucial importance of oil in the winning of the war cannot be overestimated. As you so clearly pointed out, *petroleum has made total war possible, and the assurance of adequate supplies of this fighting fuel for our combat forces and for war industry is indispensable to victory."*

As an example of the importance of oil, Cole told the President: *"Two-thirds of all the entire tonnage consumed in expedition-*

ary forces, including their transportation and protection, is petroleum." This same figure has been used recently by D. R. Knowlton, director of production for OPC, who asserted: "*Nearly 70 percent by weight of all material that must be transported to the battle front is petroleum.*"

Thus are statistics bearing out the importance of oil in this war, as well as the fact that without oil planes could not fly, guns could not fire, and neither could tanks, trucks or boats move.

Fuel for War In Mediterranean

WHILE the North African campaign calls for oil supplies from the East Coast of the United States, thereby accentuating the shortage in that area, it is to be hoped that the situation will be only temporary.

The need for supplying the military requirements in Africa will be alleviated if and when the Mediterranean is cleared for United Nations shipping. Then at least a part of needed oil could be obtained from the much nearer sources of the Near East. From Haifa, Palestine, on the eastern shore of the Mediterranean, where a refinery of over 40,000 barrels daily capacity is fed by pipe line from Iraq, it is only about 1500 miles to the region around Tunis, present vortex of war, and nearest African area to Sicily and Italy.

The Haifa plant, frequently bombed by the Germans, has been needed to supply British naval, air and land force oil requirements in the Mediterranean and Northeastern Africa. But it possibly could provide additional supplies for the present larger Anglo-American requirements throughout Northern Africa.

In contrast, a tanker going from Tunis westward for supplies would travel 4500 miles to New York and it would go about the same distance to Venezuela-West Indies or 1000 miles farther to the American Gulf Coast. Gibraltar is nearly 1000 miles closer to the Western Hemisphere points than is Tunis. Near East oil may be a factor in European battles when the Mediterranean is under Allied control.

Ultimately, enormous quantities of aviation gasoline may be needed in North Africa, for the promised heavy bombardment of war plants and other strategically important objectives in Italy. To supply that aviation fuel, the Haifa plant probably would be inadequate. But it could play an important role by furnishing lower-octane gasoline base stocks, representing a large part of aviation gasoline volume and weight, to which could be added high-octane blending agents, such as alkylate, cumene, polymerization liquid, and tetraethyl lead brought in from the United States. The blending agents constitute less than 20 percent of the finished aviation gasoline by volume.

Also helping somewhat in keeping United Nations forces in North Africa supplied will be the petroleum produced in that region. Algeria and Morocco at present can supply less than 100 barrels daily. But where there is a little oil there is likely to be more, and if production could be stepped up it would be worth many times an equivalent supply across the seas. Egypt has more important production—over 20,000 barrels per day—output having been sharply increased during the past three years.

Wooden Tires Used in Oil Fields

NECESSITY has mothered many makeshift devices, some of ingenious proportions, but under present conditions the invention of means to ease the tire shortage is especially desirable. This is particularly true of field operations of the essential but hard pressed oil industry. A step in this direction has been taken by the men in The Ohio Oil Company's East Texas and Louisiana districts under the supervision of J. J. Frommer, assistant manager, Shreveport Division, who have developed and tested wooden tires designed for use on the dirt roads of the field.

The wheel and tire shown in the photograph is constructed of a ⅜-inch steel disk surmounted with the tire of black gum wood. This tire is formed by segments of rounded wood, or cants, placed around the disk on both sides. The number of sections of cants determines the width of the tire tread. After a sufficient thickness of tire is established by the sections, steel bands—one on each side—are bolted together thus binding the tire. These bolts run through the steel disk, securing the tire to the wheel.

Although the tires were designed for emergency use in the future and are not standard equipment at present, they have been tested and one has traveled 1400 miles with but slight wear.

Drivers of the cars using these tires reported that vibration was increased over that experienced with the rubber tire. Also, unless some type of padding is placed between the wooden sections, the tires squeak considerably. In wet weather these tires are slick and travel is difficult. On the other hand, the men who developed these tires guarantee them to be puncture proof.

Aviation Fuel Needs Still Increasing

ALTHOUGH the oil industry is being called upon to furnish many special products needed in waging war, aviation gasoline and aviation lubricants remain high on the list of those needed critically and required in ever-increasing volume.

While it is anybody's guess what the strategy of the United Nations will be in 1943, it is nobody's secret that plans for air warfare are proceeding on a tremendous scale. Secretary of War Stimson laid heavy emphasis on the air force, in hearings of the House Military Affairs Committee. He estimated the 1943 strength of that branch of the service "conservatively" at 2,200,000 men, and said it would be made even larger if production and training would permit.

Whereas, other phases of munitions making have not been so singled out, aircraft production has been accorded special importance through being put under the special supervision of a vice chairman of the War Production Board, Charles E. Wilson of General Electric Company.

☆ ☆ ☆ ☆ WASHINGTON ROUNDUP ☆ ☆ ☆ ☆

By B. F. LINZ
Washington Correspondent

Presidential Order Centralizes Oil Control Under Ickes

Materials on Hand Can Be Sold to Other Operators

Additional Eastern Pipe Line Projects Completed

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ESTABLISHMENT by the President of the long-demanded centralized authority to deal with oil problems was easily the outstanding feature of the oil week in Washington, relegating to the background even the vociferous Congressional attack on gasoline rationing.

As forecast, the Executive Order supplanting the Office of Petroleum Coordinator with a Petroleum Administration for War materially strengthened Coordinator (now Administrator) Ickes' hands by giving him the authority to enforce his orders and a louder voice in the handling of materials and price problems.

Creation of the PAW with Ickes at the helm also appeared to settle finally widespread reports of an impending Cabinet shake-up which would take him out of the Interior Department and put him in control of manpower and head of the Department of Labor, with Paul McNutt, now Social Security Administrator and chairman of the War Manpower Commission in the driver's seat at Interior, and Secretary of Labor Frances Perkins at the head of social security.

The net effect of the new oil set-up will be all to the good, so far as the industry is concerned. Its problems will still be in the same hands that have been dealing with them in OPC, which is transferred bodily to the new agency by a mere change in title, and Ickes' demands for fair play in the fields of materials and prices are expected now to get quicker action. The authority to enforce orders is seen in most quarters as merely a way of making official the recommendations and requests which Ickes himself says never have been disregarded, and is in no sense a club to hold over the heads of the industry.

With the actual extension of gasoline rationing to a nationwide basis, Congressional threats of action to forestall Price Administrator Henderson died down to a whisper of "just wait until he comes up for money next year." That he will have to talk fast and persuasively to win Congress over goes without saying and plans are taking shape to demand his ouster.

But while Congress complained of gasoline rationing, Deputy Administrator Davies told New England members that a further cut in the value of A coupons was to be made and expressed the fear that unless heating oil supplies to New England can be increased quickly and materially residents of that section might actually face the danger of freezing to death this winter.

There is little doubt that the coming session of Congress will see some sharp talking about bureaucrats and the need for a simpler and more democratic approach to the problems of domestic supply. This will take in Henderson, Nelson and Eastman—practically everybody, in fact, except Ickes, whose standing in Congress has changed from a major target of criticism to the model of administrative efficiency which should be followed by all agency heads.

On December 4 Rubber Director William H. Jeffers made his third appearance in 10 days before a Congressional committee testifying at a joint hearing of Senate and House Military Subcommittees on the progress of the rubber program.

The day previous, the Senate adopted a resolution requiring Jeffers to file reports on his progress at 60-day intervals, and in them, it was specified by Senator Willis of Ohio who introduced the measure, disclose "the rate at which the rubber shortage is or is not being alleviated."

The first progress report was submitted by Jeffers at the hearing, disclosing that the rubber program has bogged down and, despite every effort, there is little prospect that it can be put back on its original schedule.

Railroad tank car deliveries to the East Coast during the week ended November 28 showed an increase of 10,103 barrels per day over the preceding week, reaching an average of 778,852 barrels, according to the PAW weekly report.

Ickes Made Petroleum Administrator and Authority Increased Greatly

IN THE most significant move involving oil taken since he set up the Office of Petroleum Coordinator for War on May 28, 1941, President Roosevelt on December 2 centralized the handling of petroleum problems in a Petroleum Administration for War and placed Coordinator Harold L. Ickes at its head.

The Executive Order, long on the President's desk (THE OIL WEEKLY, *November 23)* appeared to settle definitely rumors of a Cabinet shake-up which would take Ickes out of the oil picture and reports of efforts of the War Production Board to absorb OPC.

Far from being absorbed into any other agency or relegated to secondary position, the new administration (PAW) will exercise much greater control over oil problems with authority to enforce its orders and will have a more definite voice with respect to the allocation of materials, prices and transportation.

The President's decision met with almost universal approval among members of Congress and the industry who have been urging a centralization of authority on oil.

"Establishment of the Petroleum Administration for War and the designation of Petroleum Coordinator Ickes as Petroleum Administrator, with expanded powers, as announced by the President, is deeply gratifying to me personnally, and I am certain it will be to every oil man in the country," William R. Boyd, Jr., chairman of the Petroleum Industry War Council, said.

"Secretary Ickes has won the support and cooperation of the oil industry. We have been working harmoniously. His inspiring leadership has been matched

Full Text of Presidential Order Page 10

by the firm determination of the oil industry to do everything necessary to win the war, regardless of the economic repercussions upon the industry.

"It is no secret that many oil men have felt for a long time that the job ahead of us could be accomplished even more diligently if some of the scattered controls of petroleum matters were concentrated in the Coordinator's office, and we are grateful to the President for his action."

Ickes himself said: "In assuming the duties of Petroleum Administrator, I desire to accent two major facts: first, that the supplying of oil to our armed forces and those of our allies is no less than a prerequisite to survival; and, second, that the successful carrying out of this task is one of enormous proportions—one which will call for tireless effort, unending study, and continuing sacrifice, affecting directly or indirectly in some way every man, woman and child."

Davies Remains

The OPC organization will be absorbed bodily into PAW and Ralph K. Davies, deputy coordinator, will become the Deputy Petroleum Administrator.

The PAW is set up as an independent war agency, with the administrator reporting directly to the President. The Executive Order provides that the Secretary of the Interior shall serve ex officio as Petroleum Administrator with a Deputy Administrator (Davies) to whom he may delegate any and all power, authority and discretion conferred upon him.

A major change in the set up is that under the original order the coordinator was to make "specific recommendations to appropriate departments" while the administrator is to "establish basic policies and formulate plans and programs to assure for the prosecution of the war the conservation and most effective development and utilization of petroleum in the United States and its territories and possessions and issue necessary policy and operating directives."

The same section grants the administrator the power to issue and enforce all necessary orders and directives regulating all the operations of the industry and empowers him to distribute among the several branches and between the companies engaged in the industry whatever quantities of critical materials are allotted for the use of the industry by WPB.

In the field of price, the administrator is instructed to compile data and make surveys of the effect of petroleum prices upon the efficient wartime operations of the industry and the maintenance of adequate supplies of oil for war and essential industrial and civilian uses and, on the basis of such surveys to "consult with and recommend to the administrator, Office of Price Administration, such upward or downward adjustments in the schedule of prices charged for petroleum as will, in the judgment of the Petroleum Administrator, assure the efficient wartime operation of the petroleum industry."

Advise on Price

Conversely, the price administrator is to advise with Ickes prior to the establishment or alteration by the former of any oil price schedule and is to keep the oil chief advised of all plans or proposals with respect to civilian rationing of petroleum, and where rationing is for the purpose of maintaining adequate supplies of oil for war and essential industrial and civilian requirements, the oil administrator is to determine, after advising with WPB, the areas and the times within which such rationing should be effective and the amount of petroleum available for that purpose.

PAW also is to consult with the War Shipping Administration with respect to the assignment of tankers and the movement of petroleum and, subject to the requirements of the War and Navy departments, recommend allocations as between units of the industry of available tankers under the control of the WSA.

Also in the field of transportation, it is to designate the kind and quantity

Executive Order Establishing the Petroleum Administration and Defining Its Duties

TEXT of the Presidential order establishing the Petroleum Administration for War and defining its functions and duties follows:

By virtue of the authority vested in me by the Constitution and statutes, as President of the United States and Commander in Chief of the Army and Navy, and in order to coordinate and centralize the war policies and actions of the Government relating to petroleum with a view toward providing adequate supplies of petroleum for the successful prosecution of the war and for other essential purposes, it is hereby ordered as follows:

1. Whenever used in this order:

a. The term "petroleum" means petroleum, petroleum products, and associated hydrocarbons, including but not limited to natural gas, except that natural gas which has entered into gas transmission lines from field gathering lines shall not be so included.

b. The term "petroleum industry" means the production, refining, treating, storage, shipment, receipt, or distribution within the United States, its territories and possessions, of petroleum, exclusive of: (1) the transportation of petroleum, (2) the transmission of natural gas from the point of its entry into gas transmission lines from field gathering lines, and (3) the distribution of natural gas.

c. The term "transportation" means transportation as defined in U. S. Code, Title 49, Section 1(3)(a), and in Executive Orders No. 8989 and No. 9156.

2. There is established a Petroleum Administration for War, at the head of which shall be a Petroleum Administrator who shall be directly responsible to the President. The Secretary of the Interior shall serve ex officio as Petroleum Administrator hereinafter referred to as the Administrator.

3. The Administrator shall:

a. Subject to the provisions of this orter, establish basic policies and formulate plans and programs to assure for the prosecution of the war the conservation and most effective development and utilization of petroleum in the United States and its territories and possessions, issue necessary policy and operating directives to parties engaged in the petroleum industry, and appoint such general, regional, local, or functional petroleum industry committees or councils as the Administrator finds necessary: *Provided,* that no directive issued hereunder shall conflict with any direction which may be issued by the Chairman of the War Production Board pursuant to Paragraph 1 of Executive Order No. 9125 of April 7, 1942.

b. Serve, as far as practicable, as the liaison and channel of communication between the units of the petroleum industry and the several departments and agencies of the Federal Government on matters directly involving the functions and duties of the Administrator.

c. (1) Obtain from the Departments of War and the Navy, the Office of Lend-Lease Administration, the Department of State and the Board of Economic Warfare, the several divisions and branches of the War Production Board, and such other Federal departments and agencies as may be appropriate, estimates of the amounts of petroleum which will be required from the United States, its territories and possessions, to meet direct and indirect military, and essential industrial and civilian, requirements; and compile and analyze such estimates and submit them to the War Production Board with recommendations for the allocation of petroleum to meet such requirements.

(2) Prepare and recommend to the War Production Board estimates of the quantities and kinds of material needed by the petroleum industry to produce, refine, store, distribute (excluding transportation), or otherwise make available the amount of petroleum recom-

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of oil to be shipped and received by those engaged in the industry and certify such designations to the Office of Defense Transportation for appropriate action in providing the necessary transportation facilities.

Another section of the order instructs PAW to "review all plans or proposals for the construction, extension, enlargement or interconnection of petroleum pipe lines; subject to the over-all responsibilities of the Office of Defense Transportation, approve such plans or proposals as are, in his judgment, necessary to provide adequate supplies of petroleum for war and other essential uses and recommend to the War Production Board programs covering the amounts and kinds of materials needed for such pipe lines. The administrator shall direct the physical operation of petroleum pipe lines to the extent of prescribing the quantity and kind of petroleum to be transported by and the direction of flow through such pipe lines."

In the foreign field, the administrator is to collaborate with the appropriate federal agencies in making plans and policies and, in conformity therewith, issue directives concerning the physical operations of their foreign facilities to units of the industry engaged in operations abroad.

In the realm of rubber PAW is to perform the functions conferred upon OPC in the Executive Order of September 17, last, setting up a rubber director and, read in connection with the operating agreement between Ickes and Jeffers, means that the new agency will conduct and promote developmental research in the production of petroleum components for rubber, develop plans for new production of such materials, and be responsible for new refinery installations and their subsequent operation.

The administrator is empowered to call upon other departments and agencies for such information and data as he may require, and such other departments and agencies are to advise with him before undertaking any action which might affect the continuous, ready availability of petroleum.

All powers heretofore exercised by OPC are continued and all outstanding orders, directives, agreements, recommendations, etc., are to remain in effect.

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INVENTORY STOCKS: Frozen inventory stocks of the oil industry were released by the War Production Board December 1, in an order permitting sales under Preference Rating Order P-98-c, issued on the recommendation of OPC.

The new order permits the sale of inventory stocks by one operator to another and removes the industry from certain restrictions of the priorities regulations under which certain stocks of materials were frozen and can not be sold either within or outside an industry except under approval of the board.

Salient points of P-98-c were outlined by the WPB as follows:

An oil-industry operator can sell to another oil-industry operator any material he has in stock without first obtaining permission from the board.

An operator can sell materials to an oil-industry supplier only in accordance with provisions in Priorities Regulation No. 13.

An oil industry operator can sell materials to an operator in another industry only in accordance with the provisions of Priorities Regulation No. 13.

The order does not authorize the receipt or use of materials in violation of any inventory, quota, or use restrictions imposed by any order or regulation.

It was explained by Deputy Coordinator Davies that "by using stocks already in inventory the oil industry will be taking advantage of materials already in stock and will, as a result, reduce the number of requests for priority assistance to obtain materials that have recently been or are yet to be manufactured."

Control over the distribution and use of materials in the industry will continue to be exercised through the P-98-b and M-68 orders, both of which will remain in force, he said.

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PIPE LINE PROJECT: An additional supply of 27,000 barrels of crude oil daily will be made available to the East Coast as a result of the completion of Project 1, it was promised by OPC.

Testing of the recently reversed Tuscarora line from Nogley, Ohio, to Bayonne, New Jersey, is under way, and it will shortly begin operation at its capacity delivery of 20,000 barrels daily.

OPC officials traced the flow of the oil from Texas to the Seaboard, as it will be accomplished by the project, starting with reversals and loops by which The Texas Pipe Line Company will move an additional 18,000 barrels of oil daily from the Texas fields to Seminole, Oklahoma, which the Texas-Empire line will pick it up for delivery in Chicago. The capacity of the line has been increased 30,000 barrels a day by construction of additional pumping stations and installation of loops, approximately 22,000 barrels of which will move to the East, moving to the Indiana-Ohio state line over the Indiana Pipe Line Company and then to Lima, Ohio, through the Buckeye system. From Lima, Buckeye will deliver approximately 73,000 barrels to other lines connecting directly with East Coast points.

Also scheduled to deliver oil from Texas to Lima is the Stanolind-Illinois Pipe Line hook-up. Stanolind, by adding loops to its Texas line and remodeling some pumping stations, will increase deliveries to Chicago and Wood River by 8000 to 10,000 barrels daily, some 5000 barrels of which will go East by Illinois Pipe Line into Lima.

Total receipts at Lima for East Coast delivery will total 100,000 barrels a day.

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BIG INCH: Less than 50 miles of the "big inch" line remains to be laid, it was shown by the latest progress report to PAW.

With the first stretch rapidly nearing completion, it was disclosed that letters of intent have been sent to eleven contractors who will work on the 17 sections into which the second and longer part of the line has been divided.

One contractor already has his equipment on the stretch which will reach the East Coast and others are expected to move in within a short time.

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RATIONING: Congressional excitement over oil control continued high during the week, but inauguration of nationwide gasoline rationing December 1 quieted threats of the anti-rationing bloc to enact postponing legislation.

There was little doubt, however, that the whole question of rationing will come up for review at the next session, and members of the House threaten to force a reorganization of the present system by refusing funds for operation of the Office of Price Administration after next June 30 unless Administrator Leon Henderson is eliminated from the picture.

At a meeting of the New England delegations December 1, called by House Minority Leader Joseph Martin of Massachusetts, a seven-man unofficial committee was set up to investigate fuel-oil allotments, after members of the group had complained that the northeastern states were being discriminated against through the diversion of tank cars to other sections of the country which had necessitated orders to ration boards to be very strict. Allowables in New England, it was asserted, have been cut as much as 70 percent from last year despite assurances that the reduction would not be more than a third.

"It is an extremely serious situation, a situation that in my opinion will go

down in history as one of the most outstanding abuses of that section of the country, of any loyal section of the country, that has ever occurred," Representative Edith Nourse Rogers of Massachusetts told the House in discussing the conditions in her section. "There is no possible excuse for it and I ask for immediate action to have a petroleum 'czar' appointed before New England freezes."

There was considerable criticism voiced in both Houses of Congress during the week, and in the Senate a resolution requiring OPA, OPC, WPB and Rubber Administrator to report the name, title, salary, age, education and past business or professional affiliations of every employe drawing a salary of $3,000 a year or more was introduced by Senator McKellar of Tennessee. It was approved December 3.

Meanwhile, at OPA, it was announced that no change would be made in the heating-oil rations allowed for the second five-week period of the winter, a somewhat meaningless statement since not more than a handful, at most, of the residents of the 30 affected states yet knew what their allowable would be despite the fact that the period during which the first coupons would be valid was then expiring.

In most districts, ration boards said coupons would not be distributed until after December 15, demonstrating the extremely sloppy way in which OPA has been handling the problem, depending upon grossly overworked local boards largely manned by volunteers who had to handle not only fuel oil, but tire registrations and gasoline, sugar and coffee rationing simultaneously.

Despite Coordinator Ickes' assurance that, barring new difficulties, adequate oil would be available to meet the current rationing, OPA officials continued their "scare" campaign, Deputy Administrator Paul M. O'Leary in charge of rationing, warned that after the second period it may be necessary to cut allowables and "there can be no assurance that supplies will be sufficient to permit every householder to maintain a minimum temperature of 65 degrees, or any other preconceived minimum."

Application of gasoline rationing on a sectional basis, taking into consideration the special needs of each area for transportation, was recommended December 4 by Senator Tom Connally of Texas.

Connally declared that from the standpoint of available rubber in the possession of users and in the matter of gasoline, there should be a new national survey of the conditions and necessities in the various regions of the

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Transportation Problems Outlined to House Investigating Committee

PLANS of the Office of Petroleum Coordinator to increase overland deliveries of oil to District 1 to more than 1,600,000 barrels a day to care for rationed civilians and increased off-shore demand were outlined before the oil subcommittee of the House Interstate and Foreign Commerce Committee November 30 by J. R. Parten, director of transportation.

Parten's assertion that additional fuel oil could be brought into the seaboard area from District 2 were it not for the discouragement of refiners in the latter section through the failure of the government to absorb the increased cost of producing heating oil at the expense of gasoline, elicited from the committee strong criticism of the failure to act.

Answering questions by Chairman Lea, Parten said that about one third more oil could be moved to the East from District 2 than from District 3, and explained that while OPC sometime ago made recommendations, no plan has been worked out for compensatory adjustment for refiners.

"So that condition has been permitted to continue for six months without adjustment," Lea commented.

Representative Holmes of Massachusetts expressed indignation over the failure of the administration to take care of the situation.

"It seems to me it should not take six months to determine whether they are going to force an industry to become bankrupt," he declared. "Something ought to be done to eliminate the situation right off; if it is necessary to introduce a resolution in Congress to do it, I am going to do so."

Relating in detail the various steps taken by OPC to provide overland transportation, Parten disclosed that by next year it is hoped to have a barge movement of 185,000 barrels daily; a lake tanker and barge movement of 155,000 barrels; pipe-line deliveries of 508,000 barrels, of which 300,000 would go through the big-inch, and a rail movement of 800,000 barrels.

"Our goal," he said, "has been to deliver overland approximately 1,400,000 barrels daily to the Eastern Seaboard, but in the light of increased off-shore requirements on the North Atlantic coast it is clear that this figure will have to be raised materially in order to meet both essential domestic supply and off-shore demands. Thus far, we have been able to increase overland movements from some 50,000 barrels daily in peacetime to in excess of 1,000,000 barrels per day. To accomplish our objective, we have yet to gain overland not only about 400,000 barrels daily, but also the volume which will be found necessary to meet these increased off-shore requirements. The sole answer to the problem, in our judgment, is the completion of transportation projects now under way and the building of an additional pipe line from the Southwest to the Eastern Seaboard to carry a minimum of 200,000 barrels a day."

Parten told the subcommittee that the efficiency of large pipe line and tanker was about equal on the basis of steel requirements but that the convoy equipment and uncertainty of tanker availability removed the latter from consideration.

For every ton of steel used, he said, barges would deliver 50/100 barrel daily, tank cars 52/100, and the 24-inch line 82/100 barrels. The capacity of the big-inch could be stepped up to 450,000 barrels daily, but to do so would necessitate the installation of 200 percent additional horsepower.

With the expansion of military needs for the African occupation, he said, the 24-inch line has become imperative, and those requirements also will necessitate the construction of the proposed parallel products line.

A report showing plans and factual justification for the additional line was requested by the War Production Board in October and is now being prepared, he testified. "It seems clear," he commented, "that if the war lasts, a second large pipe line to the Eastern Seaboard will have to be provided in 1943."

At the outset, Parten told the subcommittee, the big-inch line will operate on something like 125,000 barrels of heating and 175,000 barrels of crude oil daily, and projects are now under way for the development of the Southwestern pipe lines which will be needed to maintain an adequate supply for long-distance transportation.

The big-inch, he declared, will save the equivalent of eighty-five 11,000-ton 10-knot tankers and its completion to seaboard will increase deliveries to certain overseas points with no more steel than would be required for tank ships in comparable delivery but with great savings in power equipment, manpower and money cost.

"Practically all of the projects have been delayed because priority ratings have not been sufficiently high to procure the required materials on schedule,"

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Oil

HAS A TOUGH JOB

Ahead

By D. R. KNOWLTON
Director of Production, Office of Petroleum Coordinator

An address before the Annual Meeting of the American Association of Oilwell Drilling Contractors, November 19-20, 1942, Tulsa.

THIS war we are all fighting today is a war of oil. The old saying that an army travels on its stomach may still be true, but we do know that it can't travel fast enough these days on its stomach alone. It is oil that moves the modern army, and it is lack of oil that will stall it. I imagine that a certain party in Africa could testify to that—and that he would have given his right arm, and maybe his left too, to have gotten the oil he needed. There is no weapon of modern warfare that does not require petroleum. As a matter of fact, petroleum products make up two thirds, nearly 70 percent by weight of all the material that must be taken to the battle-front. The movement of men, arms, and equipment from our shores to the far-flung battle lines of a global war is a big part of the problem too, and it is mainly dependent on oil.

The most essential requirement of a nation at war in this mechanized world is an ample supply of petroleum products. We can not get the products without first getting the crude oil to make those products; and you gentlemen are the men who can and must find that oil and make it available.

I know that every one of you here today, and countless others who are not present, are ready and even anxious to turn all your energy, skill, and ability toward getting that job done well and quickly. You would like to open the throttle and take off at top speed on a drilling program to do your best to eliminate any possibility of an oil shortage, and I would like to see you do it.

But, as you fully realize, the problem is not that simple. In an all-out program of war production, the demands for material are so great and so vital that there is not always enough to go around. The oil industry is, therefore, faced with the task of accomplishing much with little. We must do a big job with the least possible amount of material, but the fact remains that the job must be done. The war program of the Allied Nations must never be retarded by insufficient oil production. The Office of Petroleum Coordinator for War is fully determined to see that enough material is made available to the oil industry to enable it to produce the required volumes of oil throughout the duration of the war. There must not be "too little and too late."

I have been speaking in generalities while you gentlemen are specifically interested in drilling equipment. I assure you now that what I have said about oil production equipment in general applies fully to drilling equipment. It is certainly as important that the necessary drawworks, drill pipe, bits, tools, wire rope, etc., be available as it is that casing, tubing, and other production equipment be obtainable. For the production equipment would be of no use whatsoever without wells in which to place it.

Reserve Trend Disturbing

An examination of the figures on the crude-oil reserves of the United States presents a very disturbing picture. In terms of demand, there has been a constantly diminishing supply of reserves during the past 10 years. For instance, in 1933 there was an indicated supply, for the demand at that time, of 22 years; while in 1942 there is an indicated supply of less than 14 years for the present demand, and there is a strong possibility that this demand may be substantially increased. Experience indicates that an indicated supply of underground reserves of from 15 to 20 years should be maintained to insure an adequate sustained supply under reasonably efficient operating conditions. It is even more alarming to note that we have actually been producing oil faster than we have been finding it for the past several years. During the first half of 1942, new discoveries added only an estimated 150,000,000 barrels to our reserves, while production during the same period was 680,000,000 barrels. Although the number of wildcat wells drilled has been maintained at a high level, and the actual number of new fields discovered has been high, the amount of oil found has been constantly decreasing because of the poorer quality of the new fields. The drilling depths are becoming greater and the size of the pools smaller. In other words, it appears that we will have to drill more wildcats in the future to find the same amount of oil that we have found in the past.

Drilling records to date indicate that there will probably be a total of slightly over 3100 wildcat wells drilled in the United States during 1942. That is not nearly enough. Our supply of underground reserves is dwindling away toward the danger point, and there is only one way to stop the trend. More wildcats *must be drilled.* There should be a minimum of 4500 wildcat wells drilled during the coming year, and even more would be highly desirable.

In order to conserve critical materials, it is probable that development drilling during 1943 will be reduced slightly from that which was done this year. That is particularly true in those few areas which now have an efficient productive capacity in excess of the demand or the transportation facilities. In other areas continued development will be required to offset declining production rates. The Office of Petroleum Coordinator will do everything possible to obtain enough drilling equipment for the industry to carry on a program of increased exploration and development.

The increase in wildcat drilling which is so necessary at this time should mean that you drilling contractors are going to be busier during 1943 than you have been this year. I do not need to point out to this group that it usually takes much longer to drill a wildcat than it does to complete a well in proven territory.

The War Production Board has recently inaugurated a new plan to control

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Making The Most of Drilling Materials We Have

By J. S. MONTGOMERY
General Superintendent, Northern Region, Phillips Petroleum Company
Bartlesville, Oklahoma

TODAY, our Army indicates that it can use every ton of steel that the steel mills can produce to convert same into fighting material for our armed forces. Steel is a major part of our Army program, but we don't have to look very far to appreciate that copper and brass play a major part by reason of the fact that cartridges of many of our guns are made from brass, and, as a result, the demand upon brass and copper far exceeds the capacity of our mines and mills. With these two items, we can take any piece of machinery which we have operating in the drilling industry apart and find that these materials constitute the vital parts of the machine. Therefore, if it is necessary that we require frequent replacements or that we require new equipment, it is evident that we are taking that amount of material out of our war effort and decreasing drilling efficiency, together with increasing costs.

We have begun to feel the effects of the war upon delivery of oil-field equipment and, in the near future when our stocks are more nearly depleted, we will all be confronted with problems of replacement. If you had the opportunity to visit manufacturing plants in Tulsa and throughout the oil industry, I believe you would find practically every one operating at a rate of 95 percent of their capacity in the manufacture of war materials. Therefore, it is reasonable to expect that our supply of materials will be very short. You will soon be confronted with the necessity of obtaining priorities in getting tool machine time in repair shops in the field. Some of you may not have been confronted with this, but those operating in areas where defense plants are being built no doubt have experienced that difficulty. Consequently, with the problem of not being able to obtain materials and the problem of not being able to repair equipment promptly, we must think of methods of operating drilling equipment without undue replacement.

To achieve the best results in making the most of what we have, we should start with the well location and make very thorough and complete plans before moving any material to the location, thereby planning any connection work and reducing the amount of material required to operate at that location. These locations, of course, are variable and the terrain will influence the planning of the rig setup. If steam rigs are used, utmost care must be taken in choosing the source of water. If surface water can be obtained, it is much more desirable than a great many subsurface water supplies because it does not usually contain the mineral contents of subsurface water. If subsurface water is used, it should be analyzed by a competent chemical firm or there are any number of water-treating firms who will analyze the water and prescribe the necessary treatment to prevent it scaling boilers. We all appreciate the fact that scale in boilers serves as an insulation between the heat from the firebox and tubes and the water. This causes a loss of energy by this insulation effect, and causes those parts so affected to deteriorate rapidly due to the heat not being carried away from the metal to the water and naturally the metal operates at a higher temperature and reduces its operating life.

An address before the Annual Meeting of the American Association of Oilwell Drilling Contractors, November 19-20, 1942, Tulsa, Oklahoma.

Let us cover the operating parts of power rigs.

Care With Fuel

Drilling operators use diesel engines, natural gas engines, and liquefied gas engines. Diesel engines are manufactured to operate on a prescribed fuel. If you are to expect good operation from these engines, you should be sure the fuel which is purchased or which is furnished meets the engine manufacturer's specifications. The small cost of having the fuel analyzed will be paid in a very short time by maintenance to the engine and, above all else, it will be paid many times by preventing a shutdown. Where butane or natural gas is used in an engine, we often find that we experience the burning of valves, which often can be credited to using too lean a mixture of gas to air. It is not a good policy to try to conserve fuel by leaning the mixture to gas engines, as you are not providing the engine with proper fuel for maximum efficiency and horsepower, plus added maintenance. Too rich a fuel is equally detrimental, as that tends to break down cylinder-wall lubrication and also reduces power.

Sour gas is quite corrosive to engines. Gas, 200 grains and under, seems to be more harmful than gas above 200 grains. Often, treating gas under 200 grains is profitable and over 200 grains is not harmful enough to warrant precautions. Gas and liquefied-gas engines are subject to internal corrosion during a shutdown. This corrosion affects the walls of the cylinders, the valves, and quite often the parts in the crankcase. Whenever an engine is shut down, the crankcase should be thoroughly cleaned and washed with kerosine (never run kerosine in an engine-lubrication system as there is insufficient lubrication to protect the engine during the running time), then refilled with the proper grade of lubricant. Run the engine for a few minutes to assure that the oil is worked into the working parts. A lighter grade of oil should then be placed in the top of the cylinders through the spark plug holes and the spark plugs replaced, but left disconnected so that the engine cannot fire and the engine turned over for a period of approximately one minute to allow distribution of the oil placed in the top of the cylinders to the valves and the cylinder walls. Caution should be taken in not placing too much oil in the cylinders as it would tend to fill the space left for combustion and cause damage in turning over the engine. An engine should always be stored under cover as there are breather pipes and various points which are susceptible to moisture entering the workings of an engine. Care must be exercised in not over lubricating the clutch, thereby causing the faces to become dirty and burn out.

In the operation of any internal combustion engine, it is imperative that the lubricating system works at its maximum efficiency at all times, which means that the proper oil pressure must be carried and that the lubricating oil filters be kept in workable condition to prevent dirty oil being pumped into the bearings. Where engines are equipped with the box base and have handhole

plates into the oil reservoir, the reservoir should be washed with kerosine each time the oil is changed. For best operation, oil should be changed between 750 to 1500 hours. Sour gas fuel may shorten engine-oil life. The condition of the engine also affects the life of lubricating oil. The highest grade engine oil is the most profitable as it will offer the assurance of best lubrication. The cooling system of any engine should be thoroughly checked at all times to assure that the fluid used is clean and that it is not causing a scale in the water courses of the engine.

Where rotaries are moved frequently, it is naturally impossible to obtain the best water and it is the writer's recommendation that a competent chemical company be contacted to furnish proper treating compound to prevent the scaling of an engine. Scale in an engine is similar to scale in a boiler. It creates an insulation which prevents the heat being carried away from the working parts and results in the cracking of castings. We frequently hear of fancy methods of rewelding castings by inserting screws into cracks and other methods. Experience indicates that most reliable methods of rewelding a cracked casting is to place it in a furnace, heat it to a predetermined temperature, and weld at furnace temperature, then continue to heat for a period of several hours and gradually reduce the heat. Experience indicates that such welding is highly practical and very satisfactory.

Drawworks

We next go to the drawworks, as it is a vital point in the operation of a rotary. It is common that when a crew goes on tour they shut down and oil up the rig before starting their operations, which no doubt is a custom brought forward from the days of bronze bearings. With the new type drawworks using roller bearings, this procedure is highly detrimental to the bearings as a roller bearing must not be constantly packed with grease as it causes the rollers to cease rolling and they therefore slide, wearing them unevenly and causing undue wear on the races. I dare say that none of you have experienced any undue difficulty from the bearings on the front wheel of your automobile. Few of us ever think of greasing them; others grease them at yearly intervals. The same experience can be expected from roller bearings in any machinery and unless the machinery is operated at a very severe rate and an overloaded condition, greasing at several-day intervals is ample, and that greasing should not be carried to extremes as it will lock the rollers.

Chains are another item which require proper oiling. Chains should be cleaned at periodic intervals using kerosine and oiled continually while in operation by a lubricator using the chain manufacturer's oil specifications. This oil under most conditions is of a lighter or lower SAE number than used in engines. Another factor which is very detrimental to bearings and chains is the use of crooked shafts. A crooked shaft naturally throws an added strain on the bearing as the bearing is forced out of line and causes chain wear due to being operated under loose and tight cycles each revolution. By all means, any crooked shaft should be immediately straightened and not carried through to the completion of a well. Some drawworks have grooved drum shafts. If they are used, they should be properly grooved for the size line which you are using. Otherwise you will experience undue wear on the lines caused by the wrapping of the wire rope not being regular and either allows the wire rope to squeeze itself too close together or wedge into open spaces.

Mud Pumps

All mud pumps are designed to carry a rated capacity, and that capacity in most cases is based upon a predetermined maximum pressure with a certain size liner. We should have no fear of the failure of pump gears working under those conditions, providing the pump is kept in good operating condition which requires that the oil in the gear case be watched very closely to prevent it being emulsified from contamination of water or a sweating condition within the case. The best procedure in preventing contamination is to check the packing and seals on the gear case regularly. Be sure the bearings are always in good condition as a bearing failure will usually cause a gear failure or cause undue wear on the gear where its future operation will be unsatisfactory. If ring-type packing is used and you have difficulty in obtaining packing for piston rods, it is recommended that you alternate a ring of new packing and a ring of old packing as that will allow intermediate spacing of the new and old rings which will allow accumulation of a lubricant in those worn rings and usually provides added life to packing.

No doubt all of you gentlemen have had some experience in reboring pump liners. I know of no experience of flame hardening rebored liners, but it would appear that this would have some practicability in facing the shortage of materials during this war period. Some experience in hardening the surface of pump rods indicates this procedure is unsatisfactory.

Most rigs use V-belts which are manufactured in sets of equal length. A V-belt set which does not have equal tension throws additional strain on the tense belts and the loose belts ride free on the pulley and do no work. Consequently, the replacement of one belt in a set of belts is not usually satisfactory as the new belt when placed in service will probably show equal tension for a short time, but will eventually become very loose, resulting in the placing of the load again on the old belts. You should use every precaution in seeing that any belts purchased are bought in matched sets and hold the belt manufacturer or salesman responsible that these belts are matched and carry an equal load.

Rotary tables are exposed to mud, water, and other foreign particles necessitating that they be kept thoroughly sealed and properly lubricated. They should be checked between each well to be sure that the oil is not emulsified from water, as emulsified oil is very detrimental as a lubricant.

Swivels are designed for a specified load. When overloaded, the bearings are subjected to extreme pressures and frequently fail. Packing and lubrication of the swivels should be checked thoroughly to see that they are properly lubricated and kept free of emulsions. Overloading of the swivel is the best method known to cause its failure.

The proper size traveling blocks and their proper lubrication is the most essential point in maintaining their satisfactory operation.

Care of crown blocks is the same as traveling blocks.

Wire Lines

The life of a wire line is dependent upon its application to load, drum shaft, and grooved pulleys. A wire line subjected to a worn pulley will wear quite rapidly, and a wire line subjected to small diameter drawworks shaft, small crown pulley, and traveling-block pulley, can be expected to have a short life. Each operator should check lines to see that they are working above the minimum diameter of pulleys for maximum wire-line life. Under no conditions should the size of the wire line be changed without matching the specifications of the pulleys over which it works. Experience indicates that we receive approximately the same life out of one 1800-foot wire line as we receive out of two 1300-foot wire lines by cutting off the drawworks end of the line as it shows deterioration, lengthening the line through the dead end. Proper tying of the line to the drawworks and the dead end is quite essential as a square corner or sharp bend in any wire line tends to destroy it. If you would decide to use the 1800-foot practice you should be very careful to see that the dead end of the line is carefully clamped to prevent it going through a bend greater than the diameter recommended

by the manufacturer for the operation of a wire line.

Application of rotary hose in the proper size and proper pressure specification are essential for maximum life. The most detrimental point to a rotary hose is in moving it, as a great many movers do not protect the hose and allow heavy objects to rest upon it. One should be very careful to see that the hose is not coiled in small coils and that in its application to operations, it should be in a sufficient length to prevent abrupt bends as the new type of built-in connections are stiff. Short lengths of hose tend to make sharp bends and result in short life. Never allow the hose to rub against any object, and, if it is necessary, protect the hose with boots.

A great many rotaries today use portable derricks. Many are still using the conventional derrick. The operator should thoroughly check to see that the derrick is built sufficiently high to allow the proper spacing between the rotary table and any connections or blow-out preventers necessary in the operation. It is not uncommon that the base of derricks would settle where they are not of a deep concrete permanent nature. It is therefore necessary that the derrick must be checked frequently for leveling and it should be checked every day to see that all of the foundation pedestals are in proper position to prevent a strain being placed on the derrick with only three of the derrick legs carrying the load, as this is a sure method of collapsing the derrick.

General care of the auxiliary equipment engine driving the wash pump, air pump, and generator is similar to that of the engine on the rotary rig proper. The proper oiling and oil changes should be checked. Protection of electrical wiring is very essential as wire will not be obtainable.

Hand tools are a problem to most rotary-rig operators as they become easily lost and are carried away by the crew. A proper tool board painted to facilitate each necessary tool often prevents the disappearance of tools and if the tools are properly locked in a box when moving the rig, there should be little possibility of their being lost.

Many operators frown against the application of resharpening slips, however, in this day of necessity, we may learn to do such things, not because we think it is correct, but because of necessity. However, it is my belief that the resharpening of slips is applicable.

The operator should check the jaws, locks, and pins of tongs frequently to see that they are kept clean and well lubricated to prevent undue wear.

The life of drill pipe varies with areas in which it is used as some areas encounter formations which develop a very corrosive fluid and the drill pipe deteriorates before the tool joints are worn out. Other wells encounter abrasive formations in which the tool joints are worn and the drill pipe is in good condition. There are service companies making satisfactory internal inspection of drill pipe to advise when joints of pipe should be laid down or the entire string laid down. Experience indicates that this service has been satisfactory. Where pipe is worn out from corrosion tool joints should be salvaged and used on other pipe. It would appear that a program would be most applicable whereby tool joints in corrosive areas would be transferred to pipe used in abrasive areas, thereby allowing two sets of tool joints to a string of pipe in abrasive areas and reducing the requirement of purchasing new tool joints. It is, of course, appreciated, that some types of tool joints are not salvageable. The outside wear of tool joints has given a great deal of concern to rotary operators, and you have seen the building up of tool joints by welding on a hardening material. However, it seems that the most practical method today is to apply a sleeve to the tool joint. Where tool-joint threads are worn and the body of the joints is still in good condition, it is very practical to turn new threads. Uneven wear on tool joints may be attributed to crooked drill pipe, and above all other things, an operator should be very careful in seeing that his drill pipe is straight at all times or he may expect undue wear which will be first noticeable by uneven wear on the pipe and the tool joints.

There has been some experience in building up drill collars and some experience in resleeving drill collars. However this experience to date leaves some question as to its success.

Where bits have not been worn badly and their bearings are in good condition, there is every reason to have these bits retipped as they have proven satisfactory in most operations.

The greatest care that can be exercised on the kelly joint is to see that it is straight at all times and properly handled in moving from one location to another.

Reconditioning Department

There are a number of companies which have a service available for reconditioning some equipment, allowing mud line valves and blow-out equipment to be repaired satisfactorily. It is believed that this service should be utilized to the greatest advantage. Proper inspection of valves will prevent them from being used to the point that they have deteriorated beyond the repairing stage. Constant inspection of these valves will allow their replacement and repair in ample time for proper protection.

Most operators have found they cannot justify maintenance of big trucks to move rotary equipment. Consequently, they are dependent upon contracting trucks for moving. It is believed that operators would save considerable money in directing the loading and unloading of all rotary equipment as it is natural that a truck contractor loads in the easiest manner and unloads in the easiest manner, which often means that it is loaded without concern to equipment, and, frequently, equipment is destroyed by such a method. On unloading, they frequently dump the equipment off the truck which is very detrimental to threads, shafts, and bearings, and causes undue deterioration.

The only changes which we could make over the internal-combustion-power rig would be in the application of steam pressures to mud hogs and drilling engines. Some operators have found that they can reduce the steam pressure of their equipment from 350 pounds to 250 pounds and not impair the operating ability of the rig.

All rotary rig operators are today faced with the problem of labor shortage, consequently, there is a rapid turnover of labor in the operation of a rotary rig. With such conditions, it is highly essential that you have either one crew or one man on each crew who is thoroughly familiar with the operation of the machinery, knows the points where it should be lubricated, and knows how to check the various operating points for deterioration in order that replacements can be made without undue loss of time or material. Most of you have experienced sad results in not having one man responsible for certain operations of a rotary by reason of the fact that one crew passes the buck to the next crew and as a result, those points requiring attention are not properly cared for. Proper delegation of responsibility is essential.

Many rotary operators move material from one location to another which is not useable or is not needed. Reduction in material moved saves transportation costs, and vital trucks and rubber. Sell junk, as it costs money to move it.

In general, the application of cable-tool equipment such as wire line, engines, belts, bearings, etc., is similar to a rotary. However, we find in most cable-tool operations the sleeve-type bearing rather than the roller bearing, and as a result in using sleeve bearings one should carefully lubricate them each tour as there is no possibility of overlubricating them except where there are dust shields which can be broken from overlubrication. Where there are dust shields, a relief valve should be placed in the bearing thereby any excess pressure of lubrication will be exhausted through that relief valve.

Wartime Maintenance Kinks Extend Electric Motor Life

An Equipment Maintenance feature, in which are set forth revisions of operating technique and simple safeguards which extend service and eliminate breakdowns of priority-frozen electrical drive and generating units.

By ELTON STERRETT, Staff Writer

TOPPING the long list of critical equipment items necessary for carrying on oil production stand those electrical units involving large amounts of copper, especially the motors and generators used on diesel-electric rig operations, motor-converter sets, and the A-C and D-C motors required for driving oilfield equipment.

Perhaps because the units are built of comparatively few separately moving parts, and with little apparent possibility of wear, they are regarded by many switchers, roustabouts and roughnecks as being so ruggedly constructed as to absorb unlimited abuse, and to need no maintenance other than an occasional squirt of lubricant into each of the two main shaft bearings.

Much useful life is being added to electrical equipment through the addition of protective devices which reduce the amount of dust reaching the unit. Dust in the bearings is effectively screened out by the motor manufacturer, with the lubricant seals which prevent leakage past the bearings, and by the provision of some effective cover on the lubricant well. But the most serious effect of dust and dirt is felt in the windings. Motors—and this also applies to generators—are heat-producing machines, a portion of the electrical energy within them being transformed into heat, which must be radiated or conducted away if the temperature rise is not to pass the point where insulation is endangered and breakdown invited.

It is in the clogging of air passages, and in the building-up of a heat-insulating coating over windings that dust is the most serious saboteur of motor life. Since the cooling effect of a current of air over the winding is dependent upon contact with the heated insulation to effect heat-transfer, it is evident that a relatively thin coating of dust can lower the rate of heat transmission to the point where the winding is exposed to temperatures greater than those for which it was designed. Dust also tends to eddy and settle out in any change of direction in the air passages built into a motor for the forced-draft cooling required by many types. This draft, varying with the type of motor and service, is relied upon to carry cooling air currents throughout the unit, and due to limited clearances, is frequently confined to extremely narrow passages. The accretion of relatively small amounts of dust within these passages not only cuts the air flow by reducing the cross-sectional area of the passage, but also changes the friction coefficient by adding roughnesses which did not exist in the design.

The dust drawn into an electrical unit by the ventilating system may be relatively oil-free, or may be mingled with tiny droplets of oil in the air stream. Once either type of dust is deposited within the motor, it becomes a pad or sponge which tends to trap and hold any oil or moisture present, forming a focal spot for the attack on the insulation by the oil carried in the deposit. Such oil action not only reduces the insulating effect of the material, but frequently causes it to swell, deranging the delicate rotating balance of the motor, and even causing distortion to the point where actual contact is made across the normal operating clearances between rotating and fixed portions of the unit.

Dust Prevention

The time to combat dust is before it reaches the motor. If not compacted by oil or moisture, much of the deposit may be blown or sucked from a unit by compressed air or a vacuum cleaner, but such an operation requires a shutdown of the unit, and is never completely effective.

Where ventilating ducts on a unit normally point downward, being so designed to avoid trapping falling particles of dust, horizontal extension of the entrance ducts away from flooring, especially if the motor be placed close to a walkway, greatly reduces the amount of material carried into the windings. Equipping the motor with an air-cleaner, especially of the oil-bath type, is apt to result in the substitution of oil droplets for the dust, resulting in accelerated deterioration of the windings and excessive shop maintenance. Filter-type air-cleaners, in which sufficient area is presented to insure against stifling the motor through constriction of flow, greatly extend motor life, and are a must under war conditions in areas where the dust is sufficient to form a noticeable coating on smooth, painted surfaces over a 24-hour period.

Where motors are operated in explosion-proof booths, screening or filtering the inlet air and provision of a duct to the outside for such air as has passed through the unit takes advantage of the tight enclosure and reduces the time during which dust entry can occur to that required for periodic examination of the unit by the operator.

Since the windings of a motor are not readily visible, and in some types of motors can be examined only by removing cover plates, the presence of dust is often not suspected until failure occurs. If dust settles on stationary equipment in still air, it is safe to assume that equivalent areas within the motor are exposed to from four to as much as 20 times the dust deposited by normal room ventilation currents, and the maintenance schedule should be planned accordingly.

When the motor is used where the dust includes abrasives—and this includes operation in a building where a bare or unpainted concrete floor is present—use of an air jet for removing the accumulated deposits may introduce a hazard even more serious than the presence of dust in the windings. High air pressure on a jet will tend to drive the abrasive particles in the dust into the windings, out along the shaft to the

oil-sealing rings, and even into the bearings themselves. Particles freed from their resting places are set in motion and given a velocity so high that they do not follow the air stream, but deposit again at the first abrupt change of direction, and thus may be carried farther into the unit instead of being removed.

Many maintenance men, when using air for cleaning a motor, restrict the pressure to a maximum of 30 pounds per square inch on the hose carrying the nozzle. This pressure, expanded through a flat or conical nozzle, gives flow enough to loosen dust deposits without building up high velocities to cause cutting of insulation or re-bedding of the material.

In most instances, it is possible to observe the precaution of blowing through the unit opposite to the normal flow of cooling air. This tends to pick up the fluffier material which has carried deep within the windings and to remove the heavier deposits near the entrance to the ducts without necessitating travel through the remainder of the unit. Some maintenance men have found that the combination of a vacuum at the (normal) entering passages of the motor ventilating system with a low-pressure jet at the other end of the ducts, results is loosening and removal of a higher percentage of the deposits than can be secured by use of either method alone.

When the accretion of dust and oil within a motor has produced a coating which resists all efforts to dislodge it with air currents, scraping may be required. Use of metal scrapers is extremely dangerous, as the insulation underlying such a deposit may be softened and easily scraped away with the gummy deposit, or if not removed, may be broken down so as to expose the wire within. Wooden scrapers are slower than metal ones, but are much safer, and the additional time thus expended is more than balanced by the extended insulation life.

Even scrapers sometimes fail to remove deposits, and a solvent must be used. If this remedy is indicated, and it must be done in the field, solvent should be used sparingly, taking care not to soak the insulation. Many solvents which dissolve the gummy deposits also tend to soften insulation, and thus may do more harm than good. Also, some solvents are highly explosive when vaporized, and may remain within a motor in proportions of an explosive mixture, awaiting only a spark to explode and damage windings or even wreck the unit.

Quick Diagnosis of Motor Ailments

Symptoms You Can See

Symptom	Possible Causes	Cure
1. Excessive sparking or flashing at brushes. Blackened commutator.	Rough commutator.	Sand or turn down, depending on depth of surface roughness.
	Low bar on commutator.	Grind or turn down balance of commutator.
	High bar on commutator.	If extreme, lower with mallet . . . tightening clamping ring. Grind true.
	High mica.	Undercut.
	Brushes too short.	Replace—with harder grade— if worn too soon . . . and not by rough commutator. (Sometimes **underloaded** brushes wear abnormally fast.) Ordinarily, set should last for a minimum of 2,500 hours.
	Insufficient brush tension.	Adjust.
	Weak brush springs.	Replace.
	Brushes sticking in holders.	Free them. Clean brushes and holders.
	Dirt or oil on commutator.	Wipe off. Clean brushes if glazed.
	Water dripping on commutator.	Plug source—or rig shield.
	Shorted armature winding.	Test for short—after removing metallic contact between commutator bars. Repair armature.
2. Intermittent sparking at brushes.	Open armature winding.	Locate and replace bad coil—or repair defective joint.
3. Fine dust under coupling employing rubber buffers or pins.	Misalignment.	Realign set.
4. Smoke, charred insulation, or solder "whiskers" extending from armature.	See item 12; but if evidence is of **past** overheating, check for loose soldered connections that might cause future trouble.	
5. Motor won't start.	Usually line trouble—single-phasing at starter.	Correct. Check source of power supply. **DON'T merely try to make it go—while motor sits there and "fries"!**
	Load too heavy. Disconnect motor to see if it starts without load.	Reduce load—or replace motor with unit of greater capacity.

Carbon tetrachloride—used with proper precautions to safeguard the operator—is non-explosive, and effective on most gummy deposits. It should be used sparingly, to soften the deposits and permit their removal by scraping, rather than in flood sufficient to wash them away. Gasoline, kerosine and other petroleum-base solvents dissolve or soften rubber, and are apt to leave the windings in worse condition than before removal of the gummy deposits.

Some of the chemical cleaning agents, used in water, act quickly to soften the gummy accretions, but must be used with care to prevent flooding the windings. Lye and similar reagents, while loosening the oil binder of deposits, also attack the fibrous covering of the insulation, and may cause more extensive deterioration than the original material.

Drying Motors

One of the causes of oil-field-motor failure is the occasional flooding of the unit. In river-bottom and other low-lying leases, the pumping equipment may remain under water over a period of from a few hours to as many weeks before the maintenance crew can attempt to recondition the units. Motors which have been under water, even for only a few minutes, are sure to have all the lubricant floated away from the bearings, and more or less water-borne grit deposited in its place. This alone demands dismantling of the unit and thorough cleaning.

When such a unit is dismantled, it is often reassembled prematurely, the surface of the windings appearing dry and giving no hint of the water held within the turns by capillary action. Drying may be accomplished simply by placing the unit in the sun, turning at intervals to permit the warmth to reach all parts of the winding and cause gradual evaporation of the moisture.

Where an oven is available, the motor may advantageously be placed within it, and the heat regulated to remain under the critical temperature of the windings. This may be calculated roughly from the critical data carried on the motor name-plate. If the motor is designed for a 40° C. rise, and normal temperature of the surroundings does not exceed 100° F., the oven temperature may be set to reach $100 + 40 \times \frac{9}{5}$, or 172° F. without exceeding safe temperature for the windings. Many maintenance men choose to disregard the conversion factor from the usual name-plate limits in degrees Centigrade, and set oven controls to cut off at the arithmetical sum of working and safe overload figures, which, in the example cited, would call for not over 140° F. as maximum. Such drying may require a little more time, but is then sure not to overheat any part of the windings. One motor-

maintenance unit, charged with the upkeep of more than 200 units of from 5 to 15 horsepower on as many pumping rigs, uses an electrically heated hair drier of the fan and element type to provide gentle circulation of warm air through the windings.

An ordinary ventilating fan, set up behind hot elements, steam pipes, or even blowing around the hot exhaust pipe of an internal-combustion engine, will provide the required warmth to accelerate drying, though in such a case care should be exercised to see that the fan does not stir up dust and begin deposition of a new coating inside the windings.

Current may be circulated through the windings and heat thus produced within them, driving the moisture outward. If such a method be used on a motor, the armature must be blocked to prevent rotation, and a rheostat cut into the heating circuit to provide regulation ample to permit the temperature within the winding to be held under the design maximum. Where a thermometer cannot be set within the windings to check this temperature, it may be placed outside the windings and held in place with insulating tape. In such a case the reading is apt to be as much as 10 degrees lower than the maximum reached within the windings, and provision should be made to allow for this variation.

Following any immersion or serious wetting of a motor, requiring drying by any of the methods outlined, the unit should be given a coat of good insulating varnish before being restored to service. Such a unit should also be checked carefully during the first few hours of such service at full load, during which period any interior breakdown should become apparent and permit removal before even greater damage be sustained.

Lubrication

The very simplicity of lubricating the usual oil-field type of motor frequently works against the best maintenance of the bearings. The ball- or roller-bearing type of unit may be grease-lubricated, in which case great care should be exercised not to add so much grease that it is forced out through the seals on the inside of the motor, there to reach the windings and cause trouble. Where such bearings are packed with grease and then sealed within the motor housing by dust-proof covers, the tendency is to use plenty of grease — "plenty" in nearly every instance being too much. If there is more than the required coating of grease over the component parts of the bearing, work must be done on the excess to force it through relatively restricted clearance passages with each revolution of the motor. This work results in liberation of heat which, in turn, thins the grease and may render it unfit for the requirements of the motor.

It is sufficient in most cases if each unit of the bearing be given a thin coating of the proper grease (and for this the motor manufacturer's recommendations rather than the type of grease made by the company should be followed). When such greased units are assembled, any inequalities in distribution are quickly compensated for by rotation of the unit, and any slight excess crowded into the clearances of the bearing without unduly heating it.

Maintenance crews have found that some motors, turned in for overhaul, have been forced from service simply because the bearing was filled so full of grease that rotation of the members was prevented, and the balls or rollers then had to act as a sleeve bearing, with reduced contact area and consequent highly accelerated wear.

Where bearings are lubricated with oil, any expenditure for the proper grade and type of oil over and above that chargeable for ordinary (gas-engine) oils pays dividends many times in prolonged operating periods.

Unless prolonged non-stop runs are required, all additions of oil should be made with the unit at rest. Ring-oiling devices, provided with a sight glass to show oil level, do not indicate the amount in a bearing while running, it being possible to add enough oil to flood a bearing without any of the excess reaching the glass. If the sump is provided with the overflow or set-level type of inspection outlet, the addition of

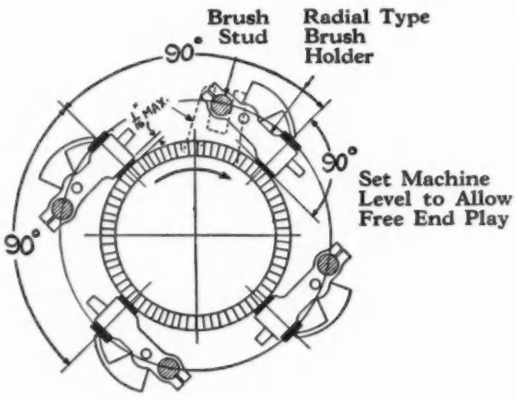
Quick Diagnosis of Motor Ailments

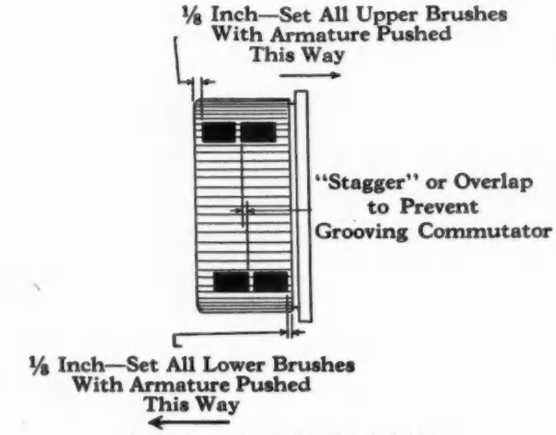
Symptoms You Can *Hear*

Symptom	Possible Causes	Cure
6. Excessive hum.	Uneven air gap. Measure with feelers.	Replace bearings—**before** introduction of scraping noise indicates rotor is rubbing against stator.
	Unbalanced rotor. Check on parallel bars.	Balance with solder on band—or weight attached by cap screw and lock washer.
7. Regular clicking.	Foreign matter in air gap.	Take out rotor; remove matter.
8. Rapid knocking.	Misalignment—probably causing shoulder of shaft to pound periodically against bearing end.	Realign set until knocking disappears.
9. Brush "chatter."	Extreme motor vibration.	See items 10 and 11, below.

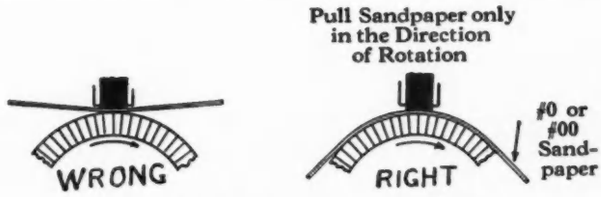
Symptoms You Can *Feel*

10. Vibration.	Misalignment.	Realign set.
	Vibration in driven machine. Run motor disconnected for check.	Eliminate source in machine, if possible. Or change to a flexible belt drive may be in order.
11. Vibration—**following motor repair.**	Rotor out of balance, due to holes drilled or weight shifted . . . new rotor coil or coils.	Balance rotor.
12. Motor over-heating. (Check with thermometer —don't depend on hand).	Overload. Measure load; compare with nameplate rating.	Check for excessive friction in motor, drive or machine. Reduce load, or replace motor with unit of greater capacity.
	Dirt in motor. Check flow of ventilating air.	Blow out motor. Use solvent on wound section if necessary.
	Rotor rubbing on stator.	Replace bearings.
	Shorted stator windings.	Test with wattmeter and correct.
	Ground.	Locate with test lamp or growler and repair.
13. Bearing over-heating.	Misalignment.	Realign set. And in this—as in all cases of bearing over-heating—**keep shaft turning** until bearing is cooled . . . to prevent "freezing."
	Too much tension in chain or belt drive.	Reduce tension to point of adequacy.
	Excessive end thrust.	Reduce thrust from drive or machine. (Shaft should be permitted reasonable "axial" float.) Or if motor is off level, shim up lower end to take thrust off its bearing.
	Too much grease (ball or roller bearing).	Relieve supply to point set by manufacturer.
	Sticking oil ring (sleeve bearing).	Clean, repair, or replace—as necessary.
	Insufficient lubricant.	Add—up to point set by manufacturer.
14. Commutator hot.	Incorrect grade of brushes.	Replace with proper grade—as specified by manufacturer, unless otherwise indicated.
	Excessive brush pressure.	Decrease brush spring tension.

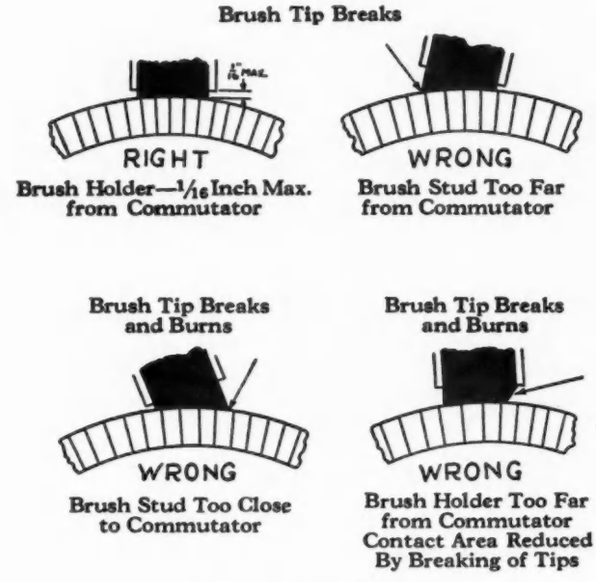



⅛ Inch—Set All Upper Brushes With Armature Pushed This Way
"Stagger" or Overlap to Prevent Grooving Commutator
⅛ Inch—Set All Lower Brushes With Armature Pushed This Way

Instructions for setting brush holders.



How to hold sandpaper when seating brushes.


Brush Tip Breaks
RIGHT
Brush Holder—1/16 Inch Max. from Commutator
WRONG
Brush Stud Too Far from Commutator
Brush Tip Breaks and Burns
WRONG
Brush Stud Too Close to Commutator
Brush Tip Breaks and Burns
WRONG
Brush Holder Too Far from Commutator Contact Area Reduced By Breaking of Tips

Causes of brush failure.

oil should be made long enough after the unit has stopped to allow oil throughout the bearing to reach the sump and thus indicate the true amount already present.

Excess oil is forced through the oil seals, and works out along the shaft, to find its way into the windings and cause premature breakdown of insulation. Many operators, finding a line of oil spots up the motor-room wall, believe that all the excess oil is thrown off by centrifugal force immediately after working past the bearing cap. Much of the waste oil is thus removed, but a film may be observed to creep along the shaft, over any shoulders which may exist, and thus to attack the windings. Installation of a sling ring just outside the bearing, where wear prevents adequate oil seals from being maintained, will care for normal bearing leakage, but should not be relied upon to exclude over-oiling surplus from reaching the windings.

Motor manufacturers specifying lubrication schedules for their equipment, unless the motors are known to have been designed especially for oil-field service, frequently figure on an 8- or 10-hour operating day and a 5-day week, whereas much pumping equipment is run on a 24-hour, 7-day basis. This stepped-up operation resulted in the changing of inspection and lubrication by many companies to call for as many as four rounds to one previously. On such a basis oil sumps in ring- or chain-oiled bearings should be drained and flushed at monthly instead of quarterly intervals, and even more frequently if the drained oil shows the slightest tint of "color" or fouling.

Many bearing failures, formerly charged to lubrication failure, are now being avoided through complete check of motor-operating conditions and the relieving of any overload thus found. Although not in itself an item of motor maintenance, proper tension in the chain or belt drive between motor and driven unit is highly important. When it is realized that the oil film separating shaft from bearing—in the case of a sleeve or plain bearing—is no thicker than the wall of a soap bubble, it becomes apparent why overstressing such a thin coating of oil can result in its breakdown, metal-to-metal contact, and a burned-out bearing or wrecked unit. Frequent check of belt or chain tension, with prompt adjustment if the slack falls within recommended units, pays large dividends in extended motor bearing life.

Tracing Breakdown Causes

With growing difficulty in securing replacement units, or even of acquiring the necessary material for home repair of motors, many maintenance crews no longer stop with the simple operation of removing a failed unit and its replacement with a reconditioned one. The unit on which the failure occurred is kept out of service long enough for a few routine checks, and any abnormal conditions corrected before installing the replacement.

Since almost any bearing failure sets up heat enough to vaporize or burn the relatively small supply of oil or grease in the bearing, it was formerly thought that any bearing failure was inherently a lubrication failure. Study of the set-up, or if conditions prevent that, a close watch over the replacement unit during what would normally be considered a breaking-in period, usually brings to light the contributing cause behind the actual motor trouble.

One company experienced repeated failures of a 5-horsepower motor driving a pumping unit on a well which, well

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studies showed, should have been handled by a 3-horsepower unit. Each breakdown was replaced by the maintenance crew in the morning, using a motor which had been tested under the usual overload conditions in the shop, only to have failure occur within a few days or weeks. Check finally localized the trouble. The well unit not only lifted the production from the well, but forced it through a 2-inch line several hundred feet in length to the lease tank. This line was laid atop the ground, and the "motor" breakdown was finally traced to the chilling of the oil stream in this line during winter nights, resulting in a friction load many times that computed for the length of line and gravity of oil involved.

Burying the delivery line below frost level completely cured the frequent "motor failures" and relieved the maintenance crew of one of its most frequent replacement jobs.

In the motors themselves, nearly every change in operating conditions which sets up possible failure factors becomes evident in one manner or another. Vibration, especially any increase over that normally observed in a unit, is direct evidence of unbalance. This unbalance may be electrical, in the case of three-phase units indicating possible looseness in one terminal, probable failure of the transformer feeding into the motor, or unbalance of the phases through addition of new units on the common power lines. The unbalance, if mechanical, may indicate the formation of dust-and-oil accretions or, as happened in a number of outdoor installations, the building of mud-dobber nests on the windings while stand-by units were idle. It may also indicate the dislocation of one or more of the windings, due to swelling of the insulation, breakdown of the anchorage, or the sloughing off of a portion of the insulation due to action of oil, acid fumes, steam or dry heat.

Such unbalance may also be the lasting evidence of some abuse or overload which the motor has been called upon to carry, and which may be located as sprung shaft or warped bearing. One such case, in which a motor which had been running satisfactorily for years suddenly began to vibrate dangerously, was traced to the dropping of a wiping rag onto the slack side of the V-belt drive, the rag being carried around the motor sheave and dropped clear after a single passage through the drive. Shock of the impact of this obstruction against the sheave and overstressing of the belts through greatly increased tension bent the shaft; not outside the bearing, but between bearing and armature. The resulting unbalance, though not causing actual rubbing, was sufficient to endanger the unit and to require immediate replacement. Accidents such as this are being guarded against with elaborate guards and shields, and by tight enclosures when chain drives are used.

Where the motor itself is not harmed by an accident such as the one mentioned, the strain may derange the motor or driven-unit mounting, and thus introduce a condition of shaft misalignment which greatly overloads the motor.

Increase in motor temperature, when the load remains relatively constant, is indication that shaft alignment or shift in drift relationship has occurred. Close check of motor temperatures, or at least a temperature-overload relay, is now indicated where motor temperatures vary suddenly. Correction of the drive conditions which cause this overheating, while not directly motor maintenance, contribute largely to longer and more trouble-free motor life.

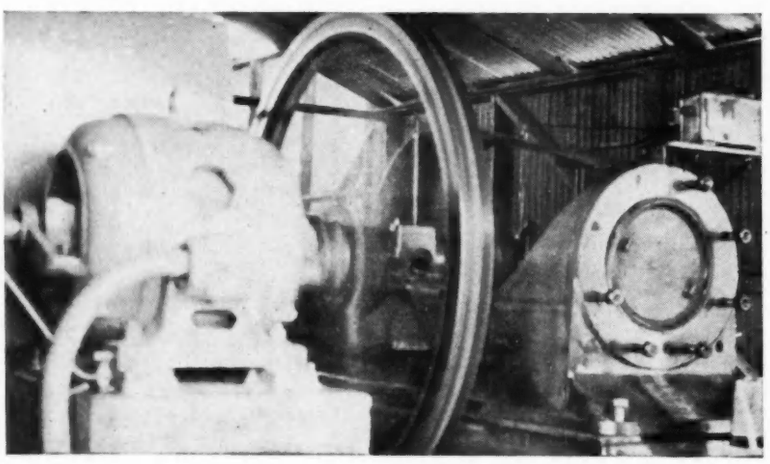
Vibration must be located as to source before it can be eliminated. One servicing unit checks in the following order unless there is direct evidence that a short-cut may be taken to discover the trouble. First, all mounting bolts are tightened and, if rubber mounted, the pads are checked to see if any has become oil-soaked or worn below the others; then the motor is checked for loose parts.

The foundation or mounting is then checked with that of a similar non-vibrating unit of like load and characteristics, if such be available. Bearings are then checked for looseness, and clearances adjusted or taken up when in excess of two thousandths of an inch plus one thousandth for each inch or fraction of an inch of journal diameter.

The vibrating motor is disengaged from the machine it drives. If it operates far more smoothly at full speed and no load when disconnected, the driven unit probably is at fault and should be checked.

If the vibration seems to date back to the last overhaul or repair, the rotor should be checked for balance—dynamic balance if possible or equipped for this test, static balance in any event. If found out of balance the needed weight should be attached to the rotor at the appropriate capscrew, hooking the weight around part of the motor to relieve the capscrew

MAINTENANCE HINT



Auxiliary Bearing for Drive

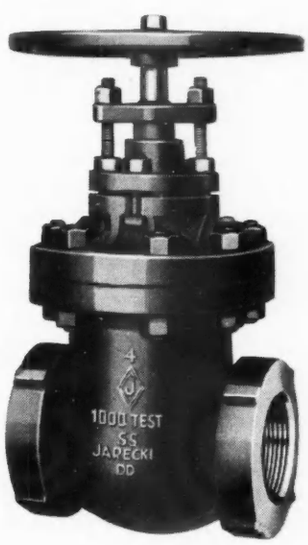
WHEN it became apparent that the weight of pulley of a pump drive would require an outboard bearing to relieve the motor bearings of excessive load, an old gas-engine base with shaft and one flywheel was mounted on a concrete base level with the motor shaft, and a coupling installed so that the motor supplied torque only to the unit, the weight of the drive being carried on the old shaft and its original bearings.

Such a mounting of the motor permits it to be freed of its load readily for testing or replacement, and with proper type of coupling, the motor is free to float in its bearings and adjust itself so as to relieve the bearings of all but the radial stresses set up by rotation of the motor.

Relieving motors on drives such as this of all save driving loads greatly prolongs the bearing life and through that factor, spaces wider apart the times when the motor must be withdrawn from service for overhaul or maintenance.

THESE THINGS WE MUST DO

WE MUST CONSERVE VALVES NOW IN SERVICE . . . EXTEND THEIR LIFE . . . FORESTALL THE NEED FOR REPAIRS AND REPLACEMENTS



New valves represent materials which have become "precious metals." They embody man hours desperately needed in our war effort. And their shipment to point-of-use requires transportation facilities which cannot be spared except for the most vital of products.

Under such conditions, our duty is clear. We must protect and preserve valves already in use. Our program of maintenance must be re-appraised in the light of new conditions — made more exacting, more inflexible, more effective than ever before. Every man who handles valves must be trained in their proper operation and service. For reasons of both patriotism and self-interest, we must redouble our efforts to extract from every existing Jarecki Valve all of the extra service that has been built into it.

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head of the centrifugal force set up in the weight at operating speed.

Since slip rings and commutators cannot be lubricated, wear at these points is expected. Wear distribution at these points can be reduced by frequent wiping free of collected dust and grit. Every precaution taken to prevent oil from reaching these surfaces pays high dividends in extended wear. Any roughness of these surfaces should be remedied at once, before continued operation can invite grooving, pitting, sparking and similar "electric" wear as contrasted with normal operating frictional abrasion.

Many repair and maintenance units true up a commutator with a commstone in a suitable holder, simply by holding the device against the unit while rotating within its own bearings. Such truing, when effective, is economical of commutator metal, and generally removes less than half that taken off by even the lightest truing cut in a lathe.

When commutators are turned down, the mica separating bars must be relieved to a depth of about 1/32-inch. Unless undercut, mica is the cause of much brush wear and excessive sparking. Undercutting of the mica should not be done with a knife or other sharp edged tool, but preferably with a hacksaw blade, ground free of clearance and to the thickness of the mica.

If a motor with sleeve bearings is observed when running normally, it will be seen to shift laterally in its bearings between the normal position when at rest and when running at speed under load. This lateral shifting within the bearing is necessary to distribute bearing and commutator wear, and prevents or largely forestalls grooving. If this shift is not present, a change in motor or driven-unit alignment frequently is found to permit this "floating" and motor life thus extended.

Overload Protection

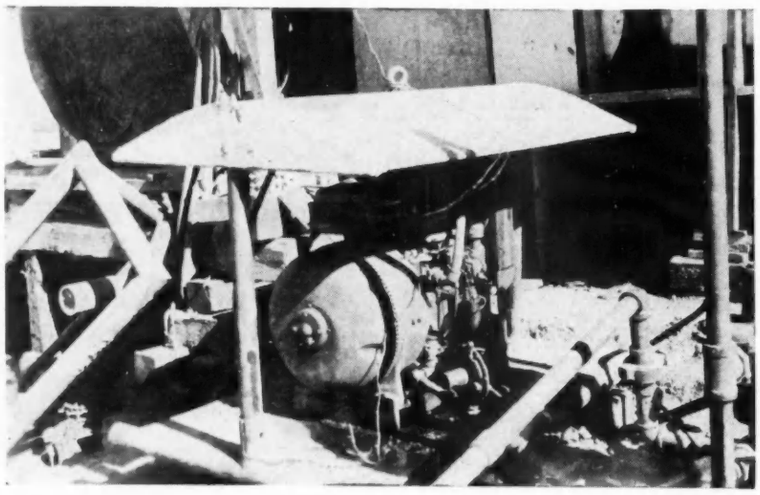
Field motors are being equipped wherever possible with overload protection, and even, in locations where the known loading imposes temporary power peaks above the unit rating, with recording devices whereon is shown the actual motor temperature during each cycle of operations. Overload units, formerly remaining inoperative over periods of years under normal conditions of motor operation, are checked at frequent intervals to determine their accuracy and reliability, and fuses calibrated against their ratings to insure against overloading or overheating a motor through excessive capacity of safeguards.

Reduction of load in certain types of drives has been found to introduce a type of motor trouble due to underloading instead of the opposite. Where reduced production on a well cannot be cared for by intermittent pumping, an induction motor may be underloaded to the point where the wattless current, that used in producing the magnetic field in the motor, is out of balance with that energy required to produce mechanical energy. Thus power factor, or ratio of real power to total power is lowered. At underload, the induction motor is operated under four disadvantages: it has higher line losses, higher voltage drop, and loses torque. This condition increases the load on the power line—a serious matter where purchased power is used, and results in higher energy cost per unit of work done. The motors tend to overheat and damage windings due to excessive current set up by the high proportion of wattless current carried. This is one of the conditions which may be indicated by excessive motor temperatures, especially when a change in operating conditions has lowered the actual work done by the motor.

Inspections

Many companies now use an electrical-maintenance inspector in addition to the usual motor-maintenance crew. Others break up the maintenance crew and make inspectors of the men between specified or emergency shop operations periods. From being regarded as a sort of stepchild of the industry, to be stuck off in a corner and left to work until failure set in, the motor and its companion, the electric generator, now rank with the most highly regarded and most carefully kept up of all types of oil-field equipment. With the gradual drawing away of trained electrical maintenance men from the field operations by the armed forces, companies are making over their switchers and operating crew men into motor checkers who, if unable to correct potential motor failure, are able to detect signs of its impending occurrence, and thus to signal the trouble and permit its correction before serious damage can ensue.

MAINTENANCE HINT



Protection of Auxiliary Equipment

THE D-C generating set used for rig lighting frequently is separately skid-mounted, to afford ease in handling, and has had little care given it until war demands on the electrical industry made it impossible to secure replacements.

The unit, in addition to being protected against the weather, as a means for insuring unfailing current, is now protected against possible damage from falling objects by the provision of a shelter or shed heavy enough to deflect or stop small objects.

One such shelter is built on a pair of 2-inch pipe supports, each with a T-head welded within the arced segment of heavy tank plate forming the roof. Sockets welded to the skid base of the unit receive the uprights, the pipe being welded therein to guard against loosening or dislodgement of the shelter. The unit is liftable through the eyebolt set in the center of the roof.

Such a roof does not interfere with the ventilation of the generator, allows visual inspection at all times, and is sturdy enough to afford the electrical equipment maximum protection at the rig and when on the truck between locations.

Recoveries Obtained Under Different Extraction Methods in Various Fields

By S. F. SHAW, Consulting Engineer

PART I

THEORIES, formulas and new ideas are of much interest when studying any scientific subject, but they should not be put into general use until it has been demonstrated that they are practical. This applies to theories pertaining to ultimate recovery in oil fields as much, perhaps, as to any other line of endeavor. High ultimate recoveries would not be sought if the cost of producing the oil is greater than the revenue received. Also high ultimate recoveries from oil reservoirs serve no useful purpose if the oil is wasted on the surface afterward, and in years gone by there undoubtedly was considerable waste on the surface. Waste takes place in almost any new industry utilizing natural resources until it is learned how to prevent that waste. During the past 10 or 15 years physical waste of oil on the surface has been singularly absent, other than that which occurs from wells blowing out unexpectedly, and every possible effort is employed to prevent the occurrences of wild wells.

In order to compare recoveries that were obtained by methods employed in past years with recoveries obtained now, it is desirable to refer to different types of reservoirs and also to the individual fields themselves. The factors necessary for computing ultimate recoveries in old fields were lacking in a much greater degree than at present. It was not realized in early years that such factors existed, or that it would ever be important to obtain them. Moreover, means and instruments for measuring such factors were lacking. It cannot be said even now that all such factors are obtainable, or even recognized. There is also a limit to the expense that can be incurred for determining such factors.

Early Development

There are several different types of reservoir sands and formations. Many of the fields where oil was first discovered and produced had low porosity, and were tight, that is, possessed a low degree of permeability.[1] Not only was the sand tight but the oil was of low gravity and contained very little gas in solution, and the reservoirs were under low pressure, which conditions made for comparatively low recovery. Conditions of low reservoir pressure and low gas content applied to many of the early fields exploited in Pennsylvania, New York, West Virginia, Ohio, Kentucky, Kansas and Oklahoma because these were shallow reservoirs.

No figures are available in the early developed fields for gas content, or for connate water where such was present to any appreciable extent; oil was used as fuel in boilers for power purposes, and probably there was considerable waste between the reservoir and the refinery. Deductions of 3 percent or more were made to cover loss in pipe-line transportation. DeGolyer states that loss between wells and the refinery was once 6.2 percent.[2] If connate water and gas content could be allowed for, and if fuel consumption on the lease and pipe-line transportation loss were accounted for it is probable figures would show that a considerably higher recovery percentage was actually extracted than has been supposed.

Deferred Recovery

In various of these shallow fields of now permeability, where recoveries have been low, even though they may not have been as low as was supposed, it has been shown that secondary-recovery methods are sometimes capable of extracting considerably more oil when the price justifies the application of these methods, and this again changes the picture. In other words, the oil in many such fields is not lost; it is deferred until it can be produced at a profit.[3]

It is a question as to whether recovery methods today for extracting oil from shallow and tight sands are notably better than those employed several years ago, aside from the betterments brought about by improvements in machinery for lifting the oil, which in itself is not a new conception as to production methods. Air and gas-drive and water-flooding methods are employed more extensively and with better results, but they are not new by any means. They have been improved gradually by a better understanding and better use of them.

Curtailment of production was not severe as a rule, until about 1930, but since that year restrictive measures have become increasingly severe. Many of the fields opened since 1930 have been very deep, and because of the greater reservoir pressure and greater content of gas dissolved in this oil, the recoveries should be higher than those of more shallow depth, assuming that spacing and other production methods remain the same, although this is partly offset by the fact that the contents of the reservoir are a little lower because of the higher shrinkage occasioned by the higher gas content of the oil. Since curtailment has become so general, the

TABLE 1

Oil Fields in Coastal Louisiana Discovered Prior to 1930*

No.	FIELD	Year Discovered	Producing Depth, Feet	Gravity of Oil	No. Wells Producing	No. Wells Drilled	Productive Acres	Estimated Ultimate Recovery, Barrels		Barrels Produced to End 1941	
								Total in Thousands	Per Acre	Total in Thousands	Per Acre
1	Jennings	1901	1500–8229	20–40	154	702	635	101,600	160,000	77,000	121,400
2	Hackberry	1927	2952–9315	21–44	127	149	1,400	60,300	43,200	36,900	26,360
3	Vinton	1910	1872–3974	18.7–33	46	448	285	49,400	174,000	43,400	152,500
4	New Iberia	1917	805–9037	20.8–33.1	80	92	290	41,300	142,500	23,800	82,000
5	Sulphur	1926	–4800	19–33	69	130	350	24,000	68,500	16,000	45,710
6	Lockport	1924	2200–6930	24–42	21	77	300	19,600	65,300	15,600	52,000
7	Lake Barre	1929	3645–10520	27–31	21	40	400	19,400	48,500	17,400	43,500
8	Port Barre	1928	1497–5427	21–39.4	43	43	600	17,700	29,500	9,700	16,200
9	Black Bayou	1929	965–6638	18–23	19	25	350	16,400	46,900	8,900	25,400
10	Sweet Lake	1927	4457–7387	28.8–35.4	21	22	200	15,000	75,000	5,500	27,500
11	Edgerly	1912	2500–4200	17–35.7	15	177	200	9,100	45,500	8,500	42,500
	Total	....	.....	.....	616	1,905	5,010	373,800	74,800	262,700	52,400

* From The Oil Weekly, March 16, 1942.

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SPECIFICATIONS				
	PITCH IN INCHES	NUMBER LINKS IN APPROX. 10 FEET	ULTIMATE STRENGTH, POUNDS	WEIGHT PER FOOT, POUND
No. 3 1/8 CHAIN	Single 3.125	39	115,000	12.6
	Double 3.125	39	115,000	24.6
TYPE F CHAIN	No. 3 API 3.075	39	70,000	8.5
	No. 4 API 4.063	30	170,000	17.2
ASA No. 200 CHAIN	ASA No. 200 2500	48	95,000	11.0

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Check Sprocket Alignment

☆ Check all sprockets for alignment on shafts. Out-of-line sprockets develop side pull that throws the load on the sides of the sprocket teeth and on one side of the chain. Such alignment is a common cause of excessive sprocket and chain wear.

Check Chain Tension

☆ Chain should carry slightly more slack than belting. Excessive tension causes unnecessary wear on chain and creates wasteful bearing friction. Insufficient tension may permit chain to jump the sprocket or ride the teeth and cause breakage.

Lubricate Frequently

☆ Frequent lubrication with a good grade of lubricating oil applied to the inside of the chain (upper side of lower run) while it is running slowly is a most important factor in extending chain life. Do not attempt to use crank case drainings from other machinery for this purpose as this worn out oil will not withstand high pressure bearing loads. Reservoirs for drip and forced-feed lubricating systems should be kept filled with a good grade of clean oil and the system checked frequently to assure constant lubrication to the chain in operation.

Keep Chain Clean

☆ A deposit of gummed lubricant on the surface of chain rapidly collects dust and dirt that becomes a grinding abrasive to sprockets and chain. To clean chain, remove it from the sprockets, wash it thoroughly in light oil and relubricate with regular lubricant before putting it back into operation. If chain is to be out of operating service for six months or more remove it from sprockets and thoroughly clean it with gasoline and relubricate before putting it in storage. Before chain is again put into service it should be cleaned again with light oil and reoiled with regular lubricant.

Check Sprocket Wear

☆ Inspect sprockets frequently for irregularity in tooth wear that would cause chain damage. Worn sprockets should be immediately repaired or replaced. Wear that has developed a hook on the driving side of sprocket tooth can be removed by grinding. When replacing sprockets that are beyond repair be sure that they are accurately made.

TABLE 2

Oil Fields in Coastal Louisiana Discovered Since 1930

No.	FIELD	Year Discovered	Producing Depth, Feet	Gravity of Oil	No. Wells Producing	No. Wells Drilled	Productive Acres	Estimated Ultimate Recovery, Barrels		Barrels Produced to End 1941	
								Total in Thousands	Per Acre	Total in Thousands	Per Acre
1	Lafitte	1935	4400–10122	31.6–42	55	60	3,250	142,200	43,800	27,200	8,370
2	Paradis	1939	9895–10340	38.6–53.7	19	21	4,225	100,800	23,800	1,300	310
3	Ville Platte	1937	8887–10245	39–63.8	190	203	3,510	92,700	26,500	15,200	4,330
4	Erath	1940	11378–11388	40.3	7	9	3,750	64,600	17,250	100	40
5	Iowa	1931	4397–8212	24–47.1	62	97	1,000	59,500	59,500	46,500	46,500
6	Eola	1939	6446–8336	42	96	101	1,900	57,500	30,300	8,500	4,460
7	Caillou Island	1930	3239–6840	24.9–42	49	59	475	50,000	105,000	31,000	65,200
8	Bayou Sale	1941	10000–10100	36.5	8	8	1,800	45,100	25,000	100	50
9	Leesville	1931	2929–6827	20–41	82	129	400	34,900	87,250	23,900	5,970
10	Golden Meadow	1938	5132–10040	36.1–43.9	190	207	1,600	34,500	21,600	9,500	5,940
11	Grand Bay	1938	6132–9990	27–36	29	32	1,000	29,700	29,700	3,700	3,700
12	Gillis	1934	6043–7376	30–42	43	120	1,200	27,100	22,600	21,300	17,750
13	Bosco	1934	7830–9118	36–59.7	53	72	1,570	25,300	16,150	22,300	14,200
14	University	1938	6421–7168	32–38	86	95	1,050	23,200	22,100	8,700	8,300
15	Lake Verret West	1938	8017–8057	32.8	18	23	150	22,900	153,000	900	6,000
16	Venice	1937	3634–7914	38–42.3	20	23	250	22,100	88,400	3,100	12,400
17	Quarantine	1937	7693–8202	32–35	34	38	1,355	21,900	16,200	4,900	3,600
18	Tepetate	1935	8297–9165	33–45	43	63	1,405	20,200	14,400	10,700	7,600
19	Chalkley	1934	8438–8668	36–52.9	30	35	2,100	19,800	9,400	2,800	1,250
20	Garden Island Bay	1936	4072–6952	32.7–45	24	40	275	19,200	70,000	4,700	17,100
21	Crowley, North	1937	7176–8815	33–36	41	44	800	17,900	22,400	4,900	6,100
22	White Lake	1940	10536–10542	32	4	4	1,250	16,600	13,300	100	800
23	Cameron Meadow	1931	4969–5273	22–27	40	66	300	14,800	49,300	8,300	2,800
24	Charenton	1936	865–7876	20.4–43	159	203	725	14,600	21,800	8,600	11,900
25	Jeanerette	1935	6609–10485	30–43.4	20	28	250	14,200	56,800	9,700	38,800
26	Roanoke	1934	6264–8856	34–45	17	31	920	14,100	15,300	11,100	12,100
27	Gibson	1937	8639–9513	37.7–45.6	20	23	975	13,800	14,200	5,300	5,400
28	Neale	1940	8356–11500	35.5	13	16	1,075	10,700	10,000	1,200	1,100
29	Bancroft	1938	7320–7580	32–62	32	43	850	8,400	9,900	2,900	3,410
	Total	....	.....	.....	1,484	1,893	39,410	1,038,300	26,300	298,500	7,600

Number of wells drilled from A.I.M.E. Petroleum Development and Technology, Vol. 146 (1942). All other data from The Oil Weekly, March 16, 1942, p. 37.

thought has become widespread that restricted extraction and wide spacing result in a greater recovery of oil and if this be the case, then estimates for ultimate recovery per acre should be higher than in the fields developed several years prior to 1930, particularly when considering the greater propulsive forces in these deeper reservoirs developed since 1930. Is this the case? Here are the figures and conditions in the following tables, and discussions applying to a large number of these fields.

Coastal Louisiana

Comparison between production obtained from fields in Louisiana along the Gulf Coast which were discovered before 1930, with those discovered since 1930, offers some interesting material for study. Eleven fields discovered before 1930 having an area of 5010 acres are given an estimated ultimate recovery of 373,800,000 barrels or 74,800 barrels per acre, of which quantity 262,700,000 barrels had already been extracted to the end of 1941, or 52,400 barrels per acre, which is 62 percent of the total estimated recovery (Table 1). Spacing is 2.6 acres per well, for 1905 wells, but the number of wells is probably greater than this, since records of many wells that were drilled have probably been lost. Twenty-nine fields discovered since 1930 with combined area of 39,410 acres are estimated to have an aggregate ultimate recovery of 1,038,300,000 barrels, or 26,300 barrels per acre, of which 298,500,000 barrels, or 7600 barrels per acre, have been recovered (Table 2). Spacing to date is on basis of 20 acres per well, but this will probably become more dense as undrilled locations are filled in. From comparison with the fields discovered before 1930 which were drilled, as a rule, with very close spacing and which were produced as rapidly as physical conditions would permit, it appears that the estimated recovery of the newer, and, as a rule, deeper fields, will have an ultimate per-acre recovery of only 35 percent of that in the older fields.

In view of the uncertain features of the estimates of the younger fields, it appears that the estimate for the older fields is likely to be more nearly correct than that for the younger fields, inasmuch as 62 percent of the estimated ultimate recovery of the older fields has already been recovered, as against a recovery to date of 29 percent of the ultimate for the younger fields.

Where the limits of the newer fields are yet being extended, estimated ultimate recoveries are being marked upward, but estimates for those fields where there are no changes in the areal extent, or in discoveries in new horizons, indicate a tendency to become reduced. This has been called to the attention of the writer in fields where he had occasion to make approximate estimates in Louisiana, in which the early estimates of ultimate recovery have been reduced drastically. It appears as if the method of estimating reserves, which of necessity now is the volumetric method, shows a tendency toward arriving at estimates that are too high.

Extensions of Old Areas

Some of the older salt domes have been extended areally during the past 10 years thereby increasing the estimated ultimate recovery, but the increase in area is in greater proportion than what appears to be the increase in ultimate recovery. A notable instance of an old field being extended is Jennings, where production has been found on the south flank within the past 10 years. Up to the end of 1926, the recovery from this field had been 39,300,000 barrels and on basis of 300 productive acres proven to that time the recovery per acre was 131,000 barrels. Subsequent recoveries have increased the productive acreage to 635, and the ultimate recovery is now estimated at

TABLE 3

Oil Fields in Texas Upper Gulf Coast Area Discovered Prior to 1930

No.	FIELD	Year Discovered	Producing Depth, Feet	Gravity of Oil	No. Wells Producing	No. Wells Drilled	Productive Acres	Estimated Ultimate Recovery, Barrels		Barrels Produced to End 1941	
								Total in Thousands	Per Acre	Total in Thousands	Per Acre
1	Spindletop	1901	800–5879	26–39	145	1,385	400	134,400	333,000	125,900	314,750
2	Humble	1905	710–5670	17–45	252	1,810	2,300	133,300	57,800	126,800	55,000
3	Hull	1918	400–5228	17–39	189	822	850	104,400	123,000	93,900	109,500
4	West Columbia	1915	354–5913	28	149	379	700	97,500	139,300	82,500	117,900
5	Barber's Hill	1916	800–7296	25–29	152	423	500	93,700	187,400	72,700	145,400
6	Sugarland	1928	2900–3900	28	51	71	1,200	92,600	77,000	30,600	25,500
7	Sour Lake	1902	500–6804	16–31	160	806	900	80,900	89,900	79,400	88,200
8	Goose Creek	1906	1000–5894	20–36	87	914	900	78,900	87,700	72,400	80,400
9	Raccoon Bend	1928	3149–4124	26–33.5	160	250	2,700	61,300	22,700	23,800	8,800
10	Pierce Junction	1921	3142–6943	21–41	64	270	340	41,000	123,000	34,000	100,000
11	Batson	1903	245–5625	20–38	170	1,017	500	40,200	80,400	39,000	78,000
12	Orange	1913	2500–6123	20–42	36	328	400	32,700	81,375	32,000	80,000
13	Saratoga	1901	500–3320	17–21	229	776	500	31,300	62,600	29,800	59,600
14	High Island	1922	1500–6700	31.5	59	139	320	24,800	77,600	17,800	55,500
15	South Liberty	1905	700–4996	21–47	40	208	250	20,800	81,200	15,300	61,200
16	Fannett	1927	3250–8300	26–38	39	54	500	17,000	34,000	3,000	6,000
17	Blue Ridge	1919	1956–4650	21–37.9	48	215	400	12,300	30,750	11,100	27,700
18	Markham	1908	936–4350	25–40	41	165	230	10,900	47,400	8,400	36,500
19	Damon Mound	1915	1406–3800	21–33	30	131	250	7,400	29,600	7,200	28,800
	Total	....	.....	.....	2,101	10,163	14,140	1,115,400	78,900	905,600	64,000

Number of wells drilled from A.I.M.E. Petroleum Development and Technology, Vol. 146 (1942). All other data from The Oil Weekly, March 16, 1942.

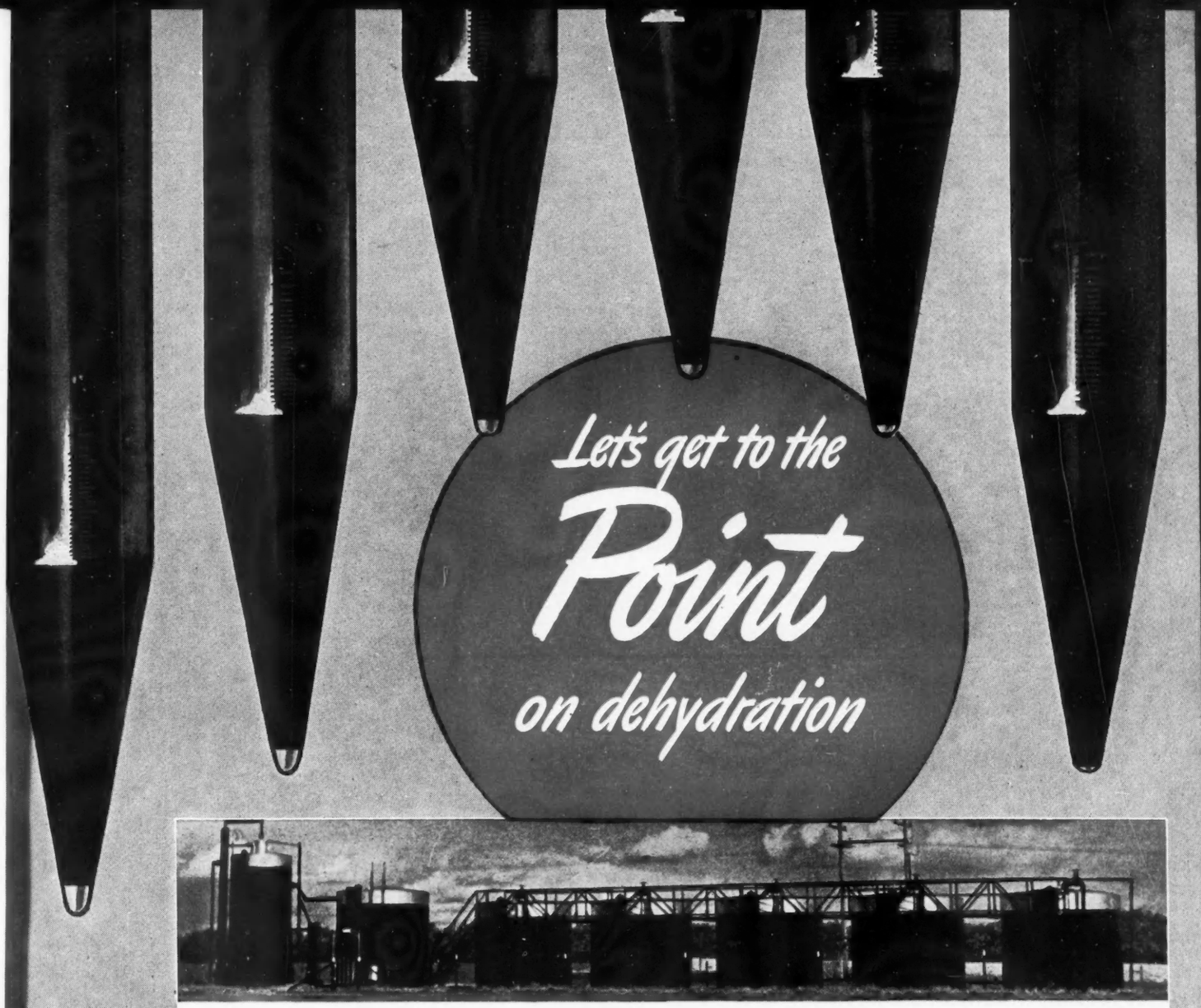

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TABLE 4

Oil Fields in Texas Upper Gulf Coast Area Discovered After 1930

No.	FIELD	Year Discovered	Producing Depth, Feet	Gravity of Oil	No. Wells Producing	No. Wells Drilled	Productive Acres	Estimated Ultimate Recovery, Barrels		Barrels Produced to End 1941	
								Total in Thousands	Per Acre	Total in Thousands	Per Acre
1	Conroe	1931	5000–5250	35–40	932	989	17,650	704,200	40,000	129,200	7,330
2	Friendswood	1937	5488–6050	20–30	211	212	4,000	414,000	103,500	9,000	2,250
3	Hastings	1934	5157–6140	30–33	692	693	5,800	365,300	62,000	35,300	6,080
4	Thompsons	1931	3050–7800	25–43	353	373	6,515	263,400	40,200	43,400	6,670
5	Anahuac	1935	7145–7600	34.5	367	389	7,000	255,100	36,400	20,100	2,870
6	Old Ocean	1934	8434–10670	52–68	107	115	10,000	162,700	16,370	14,700	1,470
7	Withers	1936	5470–5569	25–26	260	270	8,700	65,700	7,560	7,700	890
8	Tomball	1933	2045–5682	37–41	468	536	8,900	54,500	6,120	20,000	2,250
9	Oyster Bayou	1941	8250–8280	35.9	6	6	2,000	45,000	22,500	42	20
10	Manvel	1931	3871–7590	24–30	178	182	1,800	39,300	21,800	21,300	12,100
11	Lovell's Lake	1938	7690–7810	35–40	78	90	2,500	36,500	14,600	2,500	1,000
12	Segno	1936	5150–9150	36–44	81	126	2,525	30,100	11,900	5,300	2,100
13	Fairbanks	1938	6505–7185	38.8	293	309	4,000	29,800	7,450	8,800	2,200
14	Joe's Lake	1937	7600–7736	40–47	92	46	2,350	29,500	12,550	2,500	1,060
15	Gillock	1936	8300–8800	36–40	97	98	2,200	28,500	13,000	6,500	3,000
16	Van Bleck	1935	7023–8261	35–36	52	58	1,200	28,200	23,500	4,700	3,900
17	Clear Lake	1938	5790–5929	26–31	44	75	2,100	24,100	11,500	1,100	500
18	Hardin	1935	7547–7673	37–56	150	175	2,750	22,000	8,000	7,500	2,720
19	Lake Creek	1941	9200–10000	36	3	3	1,800	20,000	11,100	40	20
20	League City	1938	8690–9304	38	32	37	740	17,700	23,900	1,700	2,300
21	Amelia	1936	6778–6791	27–29	109	120	1,000	13,700	13,700	5,700	5,700
22	Dickinson	1934	7800–9142	32.3	86	261	2,700	11,900	4,400	6,900	2,600
	Total	....	.....	.....	4,691	5,163	98,220	2,601,200	26,500	353,980	3,600

Number of wells drilled from A.I.M.E. Petroleum Development and Technology Vol. 146 (1942). All other data from The Oil Weekly, March 16, 1942.

160,000 barrels per acre while recovery to date for the area is 121,400 barrels per acre.

The total acreage represented by the fields enumerated in Tables 1 and 2 is 44,420 or 60 percent of all Louisiana Coastal oil fields which is 72,490 acres. The estimated total recovery of these 44,420 acres is 81 percent of that represented by all Louisiana Coastal fields, and the production to date of the 44,420 acres is 89 percent of all these fields. These figures are noted to indicate to what extent the known productive area listed in the tables represents the total of all South Louisiana fields.

The question naturally arises as to why the older fields have produced so much more oil per acre and have larger estimated ultimate recoveries than the newer fields which have ben discovered since restricted production and wide spacing have become the order of the day. Is it due to wider spacing and to the fact that wells are so much more restricted than in the years prior to 1930? Taking these groups as a whole, it would hardly appear that porosity could have been so very different. Formation thickness may have been greater in the older fields, but was it three times as great? Reservoir pressures in the deeper fields more recently developed have been greater than in the more shallow fields and normally this would be expected to result in higher recovery percentage rather than a lower one.

Texas Upper Gulf Coast Fields

Tables 3 and 4 include the principal fields along the Texas Upper Gulf Coast area. Nineteen fields, discovered prior to the end of 1930, in which spacing averaged 1.4 acres per well have produced 906,300,000 barrels from 14,140 acres, or an average of 64,000 barrels per acre.[4] The ultimate recovery from these 19 fields is estimated at 1,115,400,000 barrels, or 78,900 barrels per acre, of which 81 percent has been recovered to the end of 1941.

Recovery to 1942 from 22 fields discovered since 1930, with aggregate area of 98,220 acres has been 354,000,000 barrels,[4] or 3600 barrels per acre; the estimate of ultimate recovery is 2,601,000,000 barrels, or 26,500 barrels per acre. Spacing to date in these 22 fields has averaged about 19 acres per well. It is interesting to note how closely the general results in the Texas Upper Gulf Coast area parallel those in Coastal Louisiana, in that the actual per-acre recovery is so much higher in the older fields, and in which the estimates of ultimate recovery also are so much higher, than for the more recently discovered fields.

The combined recovery to the end of 1941 for Louisiana and Texas older Gulf Coast fields listed in Tables 1 and 3, from 19,150 acres, is 1,489,200,000 barrels, or 61,000 barrels per acre, and estimated ultimate recovery from these fields is 77,800 barrels per acre.

The total area covered by the Texas Upper Gulf Coast fields listed in Tables 3 and 4 is 112,370 acres, compared with a total of 159,090 acres covered by all Gulf Coast fields, and production from the fields included in the 112,370 acres has been 1,259,400,000 barrels compared with 1,382,100,000 barrels, produced from all Texas Upper Gulf Coast fields, making for 90 percent of the total production from all these fields.

This comparison of all the older Gulf Coast fields with those discovered since 1930, when more severe restrictions in production began to take effect, and when wider spacing was being followed, requires a definite explanation before the present theories of wide spacing can be generally accepted.

Some Data Lacking

Salt domes discovered along the Gulf Coast afford an interesting study in production. For the most part, reliable data on the various factors that affect ultimate recovery are lacking. Most of the fields discovered in early years were spaced at very close intervals and were produced at a capacity as high as possible without jeopardizing the safety of the wells. Recoveries per acre-foot are problematical, owing to the uncertain thickness of sand, as well as uncertainty as to the particular sand from which the wells were producing, to lenticularity of sands, to various unknown factors. However, recoveries per acre were very high, as may be noted in Table 3.

Table 5, prepared by Stanley Gill[5] gives the relation of wells spacing to oil recovery of a few fields along the Gulf Coast and in other areas, to which is added data on the Wortham field. Table 6 also is prepared by Gill giving the spacing of wells in various fields of the Texas Gulf Coast.[5] The recoveries per acre-foot given in Table 6 are questioned by Alexander Deussen,[6] who believes that the production thicknesses are greater than those assumed by Teas, who reported the figures in Table 6.[7]

A large number of oil fields have been discovered along the Texas Lower Gulf

TABLE 5

Relation of Well Spacing to Oil Recovery

AREA	Field	Ultimate Acres per Well	Estimated Ultimate Recovery, Barrels per Acre-Foot	References
Gulf Coast Group	Conroe	18	862	7, 8
	Thompsons	18	608	7, 8
	Sugarland	14	928	7, 8
	Goose Creek	1	2,057	7, 8
	Orange	1	2,795	7, 8
Woodbine Sand Group	Van	7	362	8, 9
	East Texas	5	675	8, 9
	Powell	3	1,075	8, 10
	Wortham	2.2	904	....
Limestone Group	Yates	37	567	8, 11
	Luling	4	887	8, 10

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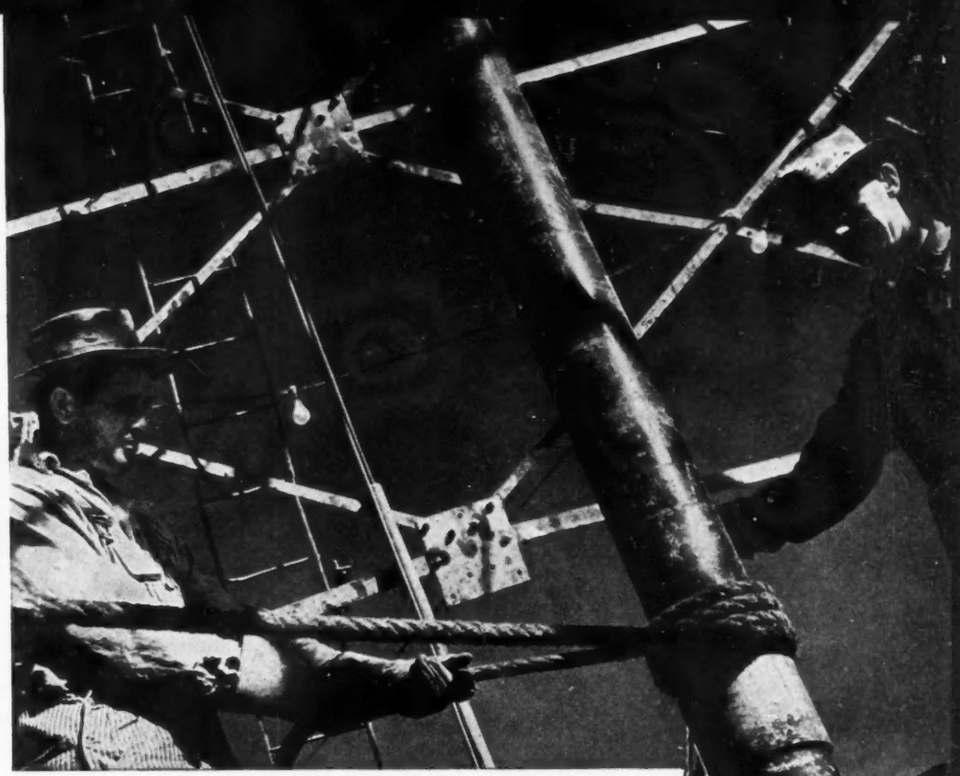

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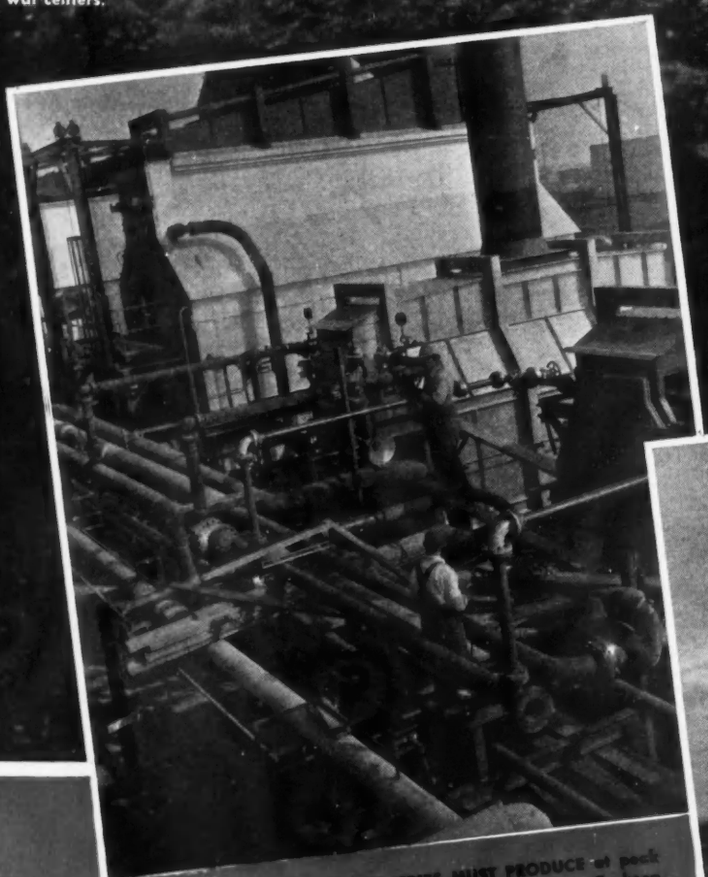

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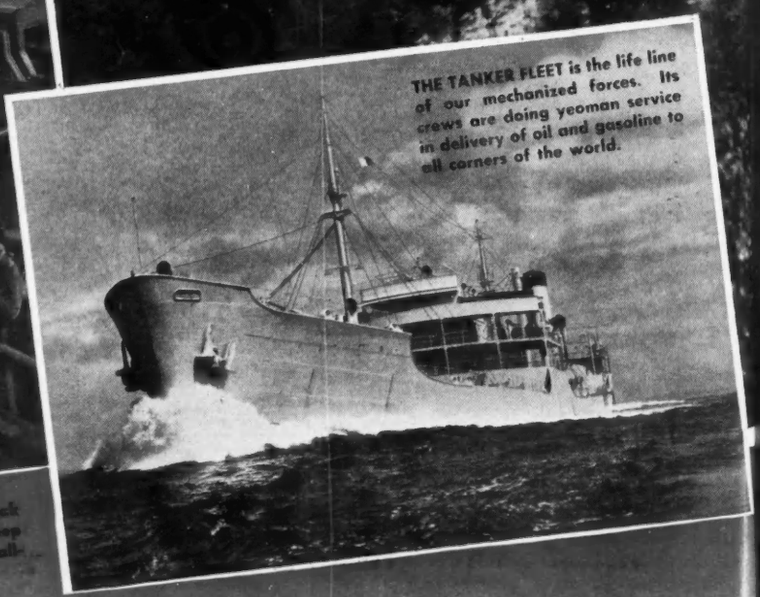

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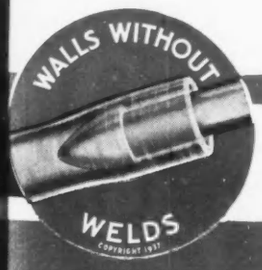

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TABLE 6

Spacing of Wells in Various Fields of the Texas Gulf Coast

FIELD	Average Acres per Well	Estimated Ultimate Total Recovery Bbls. per Acre-Foot
Barber's Hill	1.5	2,060
Big Creek	3.1	2,050
Goose Creek	1.4	1,975
Hull	1.1	1,896
North Dayton	0.92	1,335
Orange	1.3	2,790
Orchard	3.6	2,240
Pierce Junction	1.6	2,910
Port Neches	6.2	2,565
South Liberty	0.85	1,700
Spindletop	0.375	.....
West Columbia	1.1	1,293
Sugarland	16.85	970

Coast during the past 20 years. These South Texas Coast fields do not possess the same productive capacities per acre as those in the north Gulf Coast area. Twenty-two of the principal South Gulf Coast fields are tabulated in Table 7, the total area of these 22 fields covering 74,720 acres, which have produced 224,400,000 barrels,[12] or 3000 barrels per acre to the end of 1941. Estimated ultimate recovery as of January, 1942, is 1,236,700,000 barrels,[13] or 16,500 barrels per acre. Spacing density averages about 14 acres per well.

Owing to curtailed allowables having been started in most of these fields at a comparatively early period in their life, the production to date is low. The highest total recovery has been obtained at Saxet, discovered in 1923, where 45,500,000 barrels or 7400 barrels per acre, have been extracted during the past 19 years. The highest recovery per acre has been obtained at Refugio, discovered in 1920, which has amounted to 10,200 barrels per acre, or a total of 39,100,000 barrels for the field. Spacing at Refugio has been on average basis of 7.3 acres per well, but the spacing in the original part of the Refugio field was more dense than the average stated.

Owing to production being on a restricted basis in these South Gulf Coast fields, it has not been possible to construct decline curves in any but a few of the fields, and in these few fields the thickness of the sand was not large and reserves were small, and it was necessary to make early estimates of ultimate recovery by the volumetric method. Except where the limits of the fields were extended it appears that estimates of ultimate recovery are gradually being reduced as they approach their tenure of life, which indicates that there is a tendency to exaggerate the ultimate recovery when employing the volumetric method.

The highest ultimate recovery estimated for any of these South Gulf Coast fields is that of Tomoconnor, placed at 312,200,000 barrels, or 35,000 barrels per acre. The sand section here is thick, but an average of 35,000 barrels per acre, with wide spacing and slow recovery seems high in view of the small production of 2380 barrels per acre recovered to date. It is not unlikely that deeper sands in this field will be opened in the course of time.

Comparisons of ultimate recovery, or what now appears to be the probable ultimate recovery from some fields largely depleted, seem to indicate that there is a strong tendency to over-rate these fields. A few instances of this nature will be commented on in the following paragraphs:

The McCampbell field was discovered in 1936. The south extension was opened in 1938 and estimated initials varied from a small quantity to 1200 barrels per day, but these initials were made through small chokes of various sizes and do not possess much significance. Pressures observed on the surface have been as high as 2300 pounds per square inch and in some of the early wells, that were substantially gas wells, pressures up to 2725 pounds on the casing were observed when the wells were shut in. Bottom-hole pressures were probably about 2800 to 3000 pounds per square inch.

There are four principal oil-producing sands at 6500 feet, 6800 feet, 7100 feet and 7200 feet.[14] Inasmuch as the sand thicknesses are variable, and as they are lenticular to a considerable extent, it is difficult to arrive at a definite sand thickness in a given well. Reference has been made by Reagan Tucker to a combined thickness of 29 to 46 feet. With a producing area of 23400 acres and recovery of 8,900,000 barrels to December 31, 1941, the average production per acre has been 3780 barrels. If we assume tentatively an average saturated thickness of 15 feet for all four sands, the recovery per acre-foot is 230 barrels. Bearing in mind that reservoir pressures are now probably less than one fourth those at completion, the estimated ultimate recovery at 7800 barrels per acre seems high.

The Saxet field was discovered in 1923 by a well completed in the 2400-foot sand, since which time some 31 sands have been discovered in this field,[15] but in any single well only four sands have at one time or another been productive. Thickness of the sands has been variable; in some cases gas-oil ratios have been high, but after water encroachment starts, the gas-oil ratio often is low.

The 5800-foot sand in the Frio has been the thickest sand, and has been perhaps the most productive sand. It is up to 30 feet thick, and is very porous and permeable. Production has now reached the stage where large volumes of water have entered the wells varying from 90 to 98½ percent water. Some wells have been completed in this sand with 5½-inch casing, others with 7-inch casing. Wells in the 5800-foot sand with casings of 5½-inch situated below the high point on the structure will now produce 1500 to 2000 barrels of fluid per day with about 1½ percent oil content. The input gas ratio is 300 to 500 cubic feet of gas per barrel of fluid, or 20,000 to 33,000 cubic feet per barrel of oil, and at price of 2 cents per thousand cubic feet of gas the lifting cost is prohibitive, consequently such wells cannot be produced and ultimate recovery is correspondingly reduced. Wells with 7-inch casing have a capacity up to 7000 barrels of fluid per day with 2 percent oil content, and input gas-factor is 100 to 150 cubic feet per barrel of fluid, or 5000 to 7000 cubic feet per barrel of oil. With gas at 2 cents per thousand cubic feet, there is a good margin of profit, and when producing under this condition, ultimate recovery is increased.

The Saxet Heights field was discovered in 1935 by a well drillled to 4100 feet in the Catahoula formation. The field extended into the Corpus Christi city limits, and spacing varied from 10 acres per well, to as low as 3 acres per well within the city limits. Sand thickness is quite variable, perhaps 5 to 15 feet, with average thickness of perhaps 8 feet. Casing sizes were 5½-inch, 6⅝-inch and 7-inch.

Production was made through the tubing as long as the allowables could be produced by natural flow. After the allowable could not be made on natural flow, kick-off valves, or perforated collars, were installed in the tubing string and the wells produced through the tubing by gas-lift as long as this was possible. When water invaded the wells to the point that the well could not make the allowable through the tubing, the flow was turned through the casing and continued in this manner until production of oil declined, or cost of lifting increased, to the point where the operation was no longer profitable, at which time the well was abandoned.

When producing through casings with 2-inch tubing, the production of fluid at a given reservoir pressure was perhaps 40 percent of the capacity of a 7-inch casing with 2-inch tubing, consequently

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TABLE 7

Oil Fields in Texas Lower Gulf Coast Area

No.	FIELD	Year Discovered	Producing Depth, Feet	Gravity of Oil	No. Wells Producing	No. Wells Drilled	Productive Acres	Estimated Ultimate Recovery, Barrels		Barrels Produced to End 1941	
								Total in Thousands	Per Acre	Total in Thousands	Per Acre
1	Tomoconnor	1934	2300–5900	38–39	431	451	8,920	312,200	35,000	21,200	2,400
2	West Ranch	1934	5000–5700	25.2–32.1	215	323	4,260	93,700	22,000	2,100	500
3	East White Point	1938	2500–5650	26.3–38.5	229	246	3,840	90,200	23,500	5,500	1,400
4	Saxet	1923	2200–10000	24–60	580	761	6,180	84,000	13,600	45,500	7,400
5	Greta	1933	3600–6250	21.2–61.7	200	300	4,240	80,600	19,000	24,900	5,900
6	Heyser	1936	3400–6050	26–35.5	258	277	3,620	77,800	21,500	11,600	3,200
7	Plymouth	1935	5500–6150	32–38.5	179	195	2,880	60,500	21,000	19,700	6,100
8	North Sweden	1937	3800–5350	42–53	248	278	3,420	58,100	17,000	8,900	1,900
9	Agua Dulce	1928	2500–6900	40–60	75	208	11,200	53,800	4,600	2,100	200
10	Flour Bluff	1936	6650	43.3	107	116	2,380	52,400	22,000	5,900	2,500
11	Refugio	1920	1900–7700	25–52	158	521	3,820	51,600	13,500	39,100	10,200
12	Luby	1937	4000–5000	44.9–52	146	152	2,320	39,400	17,000	4,100	1,800
13	La Rosa	1938	5300–6500	36.0–51.7	89	98	1,720	27,500	16,000	2,400	1,400
14	Placedo	1935	4750–6100	23.5–56	160	179	1,680	25,200	15,000	11,200	6,700
15	Rincon	1938	3700–4400	38.7–59	54	126	1,820	20,900	11,500	1,000	200
16	Kelsey	1938	4750–6000	42–44.7	79	119	1,680	20,200	12,000	1,000	500
17	Stratton	1931	4750–6900	49.3–56	37	112	4,000	20,000	5,000	1,300	300
18	McCampbell	1936	6600–7450	38.8–49.3	275	362	2,340	16,700	7,200	8,900	3,800
19	Sun	1938	4100–5125	43.7–52	43	75	1,750	15,800	9,000	500	300
20	Wade City	1939	4700–5250	31–55	70	104	910	14,600	16,000	700	800
21	Lolita	1940	5900–6300	37.5–42.4	53	176	620	12,400	20,000	200	350
22	Saxet Heights	1935	4000–5100	25–36.5	33	252	1,120	9,100	8,100	6,600	5,900
	Total	....	.....	.....	3,719	5,431	74,720	1,236,700	16,500	224,400	3,000

the economic depletion of wells with 5½-inch casing was reached before that of the 7-inch casing by one to two years, and ultimate recovery was reduced in consequence. When input-gas factors with 7-inch casing were 300 to 500 cubic feet per barrel of fluid, the input-gas factor with 5½-inch casing was 600 to 1500 cubic feet per barrel, consequently lifting costs in the smaller casings were increased proportionately.[16] Low allowables in wells producing much water were the cause of many wells being abandoned, which meant loss in ultimate recovery. Later the Texas Railroad Commission became cognizant of this condition and made provision for water allowables in order to prevent premature abandonment and avoid consequent waste.

Estimated ultimate recovery for the Saxet Heights field as of 1939 was placed at 9,100,000 barrels, or 8100 barrels per acre. Actual recovery to the end of 1941 was 6,600,000 barrels or 5900 barrels per acre. Daily production has been dwindling rapidly; in July, 1942, it was about 200 barrels per day for the entire field, compared with a total of 1250 barrels obtained as an average for the first six months fo 1939, consequently the estimated ultimate recovery of 9,100,000 barrels does not appear possible of fulfillment.

In the Saxet and Saxet Heights fields where water encroachment was in large volume, it became evident that ultimate recovery and economic outcome were dependent to a considerable extent upon the use of large casing sizes and on producing at high capacity.

Oil Fields in the Woodbine Sand

In 1921, production in large quantity was discovered in the Woodbine sand on the Balcones fault zone at Mexia.[17] Wells came in for initials of 2500 barrels or more per day. Spacing in this field was fairly close, on the order of 7 acres per well, but not nearly as close as in the Powell and Wortham fields discovered later. Approximate estimate of the ultimate recovery in 1923 was 45 to 50 million barrels of oil from the Woodbine formation.[17] Total recovery from all sands in the Mexia field to the end of 1941 has been 97,878,000 barrels from 39,200 acres, or an average of 22,400 barrels per acre.

In 1923 production was found in the Powell field in the Woodbine sand at depth of about 2900 feet, and wells were completed with initials up to 25,000 barrels per day. A rapid development campaign started, and in October 1926, there were 827 wells producing in an area of 2600 acres, resulting in a spacing 3.1 acres per well. Probably other wells were drilled at a later date still further increasing the spacing density. Except for short periods, wells were produced at maximum capacity, and airlift was employed extensively to aid in this high production. There was an active water drive, but dependence was not placed on this to win the heavy production that was made during the early years. Gas-oil ratios were low; however, the quantity of gas was not measured in those days, nor were instruments in common use that would facilitate these measurements.

The recovery per acre-foot at Powell was considerably higher than the general run of recoveries in fields discovered later in Texas. After the flush production was over, water-drive continued to wash the oil out of the sand, and aided materially in increasing the recovery. In July 1929, daily average production of liquid of one major company was 324 barrels per well, of which 93 percent was water.[18] In the later life of the field operation, it became chiefly a matter of lifting large quantities of water to recover small quantities of oil, and continued operation was dependent entirely upon the cost of lifting the large volumes of water, and upon the price of oil. Casing sizes were 7-inch in the majority of wells, and 2½-inch tubing was employed, and during the flush production the oil was produced through the casing.

Thickness of sand in the Powell field is assumed as 45 feet by engineers of the Bureau of Mines. With assumed porosity of 25 percent, the original void contents is 87,273 barrels per acre. This does not represent the quantity of residual oil that was present, since no allowance is made for gas content, temperature of the oil, connate water content, or degree of saturation, such as is attempted at the present time in making such estimates. With total recovery to the end of 1941 at 44,300 barrels per acre, or 985 barrels per acre-foot, which does not allow for the oil that was used in boilers in the field, nor for pipe-line deduction of 3 percent and without taking into account the presence of gas or connate water content, the recovery is slightly over 51 percent. In the East Texas field where the depth is about 3600 feet, the shrinkage factor is 0.8 to 0.7, and if 0.8 be applied tentatively to the Powell field, the recovery would be 63½ percent, or 66 percent when pipeline deduction and fuel loss is considered. If connate water be assumed at 20 percent, the recovery would reach 82½ percent.

Hill and Sutton[19] state: "The above figures make it evident that recovery in the Powell field has been exceptionally high (based on about 50 percent), bearing out the theories that a high gas pressure, rapid development, and close spacing are the prime factors governing the ultimate production per acre."

The Wortham field was discovered in 1924 in the Woodbine sand at depth of

TABLE 8

Estimates of Ultimate Recovery from the Van Field, Texas

AUTHORITY	Barrels Ultimate Recovery	Reference
L. E. Smith	108,500,000 to 300,000,000	Nat. Pet. News, 4-30-1932
S. F. Shaw	150,000,000	Oil Weekly, 4-3-1933
Anon	250,000,000 to 350,000,000	Oil Weekly, 7-31-1933
Paul Wagner	340,000,000	Oil & Gas Jour. 2-22-1934
John R. Suman	357,000,000	Oil Weekly, 5-28-1934

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TABLE 9

Estimates of Ultimate Recovery for the East Texas Field

AUTHORITY	Reference	Barrels Ultimate Recovery
A. I. Levorsen	Inst. Pet. Tech., June, 1931	1,350,000,000
E. G. Woodruff	O. & G. Jour., June 25, 1932	1,500,000,000 to 2,000,000,000
J. S. Hudnall	Oil Weekly, July 31, 1931	1,500,000,000 to 3,500,000,000
Jack Logan	Oil Weekly, July 31, 1931	1,705,000,000 to 2,131,250,000
F. Lahee	Trans. A.I.M.E., 1932, p. 290	1,380,000,000 to 2,141,300,000
O. L. Brace	Oil & G. Jour., Feb. 18, 1932	937,500,000 to 1,312,500,000
S. F. Shaw	Oil Weekly, Apr. 3, 1933	1,000,000,000
Anon	Oil Weekly, July 7, 1933	1,250,000,000 to 2,500,000,000
C. E. Reistle	Oil Weekly, Feb. 26, 1934	2,203,000,000 to 2,754,000,000
J. R. Suman	Oil Weekly, May 28, 1934	2,100,000,000

about 3000 feet, and a very active development campaign followed. Some 324 wells were producing at one time on 715 acres, with average spacing of 3.2 acres per well. Initials were up to 10,000 barrels or more and wells were produced at maximum capacity. It has been estimated that the sand thickness was 35 feet, and average porosity was 25 percent, thereby making for a void content in the sand of 67,879 barrels per acre. Recovery to the end of 1941 was 31,900 barrels per acre, or 904 barrels per acre-foot, making for a recovery percentage of 47 percent, not taking into account the shrinkage due to presence of gas, temperature of the oil, connate water content, or degree of saturation. Using tentatively 0.8 as the shrinkage factor, the recovery would be 58.7 percent, or 61.1 percent after allowing for pipe-line deduction and fuel consumption on the lease, and then assuming tentatively a connate water content of 20 percent, the recovery to the end of 1941 was 76.2 percent.

A short time ago, a writer reported statements of a producer operating at the present time in the Wortham field, who appeared to think that large quantities of oil could yet be recovered from this field, owing to the large quantity of gas that was allowed to escape "wastefully" in the early days of this field. Apparently this operator had not checked into the high production that has been obtained here through this alleged wasteful manner of producing oil.

Air-lift was employed in the Wortham field in order to speed up the recovery of oil. Boilers were employed to drive many of these air-lift plants and the oil so consumed was not included in the recovery of 31,900 barrels per acre, nor was the deduction of 3 percent for pipeline loss taken into account.

Water drive was present to an important degree in the Wortham field, but gas was evidently the means utilized to drive the oil to the well until the contents were largely depleted, after which the flushing action of the water became of much importance in extracting the later and much smaller recovery. In July, 1929, the daily average production of liquid of one major company was 255 barrels per well, of which 96 percent was water.[18] By lowering the pressure around the well, which action took place automatically when producing the wells at high capacity, the oil that would have been trapped by the advancing head of water under high pressure was expelled by the dissolved gas into the advancing stream of water and carried to the well by the water. It could easily appear that reducing the pressure in the reservoir and allowing the dissolved gas to drive the oil from the tighter spots into the stream moving toward the well is less likely to allow oil to be trapped than when the water flood advances under high pressure, thus not permitting the gas in the oil to get in its work of pushing the oil out of the sand into the advancing stream.

Hill and Sutton[20] state: "It is evident that operators in the Wortham field have obtained considerably better recovery than would normally be expected. . . . Close spacing, no doubt, offers a better opportunity for more complete drainage of sands and less loss of oil from trapping between the outer limits of the zone. . . . That close spacing of wells results in a high percentage of recovery which in its own light is of marked importance. . . . If the figures presented in this report are assumed to be a correct estimate of the original content of the reservoir, the recovery of 52 percent which seems quite probable, is a material increase over what has in general been accepted as the recovery from other producing fields."

The Van field was discovered in 1929 in the Woodbine sand at average depth of about 2900 feet, and has been produced under highly restricted allowables for most of its productive life. Probably at no time have the wells been produced wide open. The spacing is on average basis of 8 acres per well. Initial bottom-hole pressure at minus 2400 feet is calculated at 1300 pounds per square inch.[21] Estimates of ultimate recovery have varied widely. Estimate of THE OIL WEEKLY in 1938 was 325,000,000 barrels, thus making for an average recovery of approximately 72,000 barrels per acre, or 270 barrels per acre-foot, based on assumed average thickness of 268 feet. This recovery is much below that of Powell and Wortham. Spacing has been much wider than at Powell or Wortham, and production has been highly restricted. Estimates of ultimate recovery compiled for the Van field were as given in Table 8.[22]

In reviewing the recovery estimates for the Van field it may be observed that there was a constant revision upward. Part of this is due to extension of the known limits of the field, and part to allowing a greater recovery per acre. The lower estimate of L. E. Smith for the field made in 1932 of 108,500,000 barrels is widely different from that of John R. Suman made in 1934 of 357,000,000 barrels. Recovery to date has been 128,991,000 barrels or 28,500 barrels per acre, or 107 barrels per acre-foot, on basis of 268 feet of productive sand. For a Woodbine sand, recovery usually can be expected to be several times 100 barrels per acre-foot, therefore, the recovery from the Van field at even the low rate of that at Mexia at 500 barrels per acre-foot would yield a total of 600,000,000 barrels, and would be twice this amount if the yield per acre-foot becomes as great as that at Powell or Wortham. However, the Van field is not drilled on the close spacing adopted at Powell and Wortham, and allowables have been greatly restricted, therefore we may assume that recovery per acre-foot in the Van field is not expected to approach that of Powell or Wortham.

East Texas, the greatest oil-field ever discovered in the United States, was opened in 1930 in the Woodbine sand at depth of about 3600 feet, and average thickness of the producing sand is esti-

TABLE 10

Production Data on Woodbine Sand Fields

FIELD	Year Discovered	Acres	No. Wells	Acres per Well	Barrels in Thousands Produced to 12/31/1941		Depth, Feet	Thickness of Producing Formation, Feet	Porosity Percent	Recovery per Acre-Foot
					Total in Thousands	Bbl. per Acre				
Mexia	1920	3,920	562	7.0	97,827	22,400	3000–3085	50	.....	496
Powell	1923	2,600	827	3.1	115,298	44,300	2925–3000	40–45	25±	985
Wortham	1924	715	324	2.2	22,768	31,900	2990–3050	35	25±	904
Van	1929	4,520	575	8.0	129,535	28,500	2682–2950	268	.....	104
East Texas	1930	136,000	26,904	5.1	1,702,847	12,500	3632–3665	35	25±	332

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mated at 35 feet, and spacing averages 5.1 acres per well with a productive area of 136,000 acres. To the end of 1941, recovery was 1,702,847,000 barrels, or 12,500 barrels per acre, or 360 barrels per acre-foot.

Except for very short intervals, allowables in this field have been severely restricted. An active water drive is present, and due to the restricted allowables, it has been contended that the recovery will be high. On the other hand, a feeling of alarm seems to come over some of the operators in this field, when there is an appreciable decline of reservoir pressure. It could easily happen that the water is acting in a manner no different from what has happened in other fields where an active water-drive is present.

In connection with the control of water in water-drive fields, it has been suggested that water-drive should be controlled, the emphasis being on a restricted control. Among those quoted as supporting the benefits of water-drive is Stanley Gill[5] who states: "It is universally true that the presence of water in an oil reservoir in such quantity and under such conditions as to cause it to enter the oil-bearing formation as oil is withdrawn, and to flush the sands, is an important factor in increasing ultimate recovery and will result, on the average, in the recovery of at least twice as high a percentage of the oil originally present in the formation as could be recovered from a strictly comparable reservoir from which water for this purpose is absent." There is nothing, however, in this statement to support the use of restricted, or artificially controlled, production, and another quotation from a private report by the same authority along this line is as follows: "Although much apprehension has been voiced during the past five years, as to the hazard of water encroachment in the East Texas field the facts lead to the inevitable conclusion, which was readily apparent from the start, that the apprehension arose from desires grounded in a wish to attain certain economic ends, and that the water problem in the East Texas field, is not, and never will be, serious beyond the common experience in other fields."

Calculations have been made that tend to indicate that the effect of water encroachment in this field is due largely to expansion of the water rather than movement of the water as a body from a long distance, but these calculations are based on the use of a coefficient for expansion of water that is several times greater than that determined in laboratory test.[5]

Tests made by Lindsly[23] indicate that the shrinkage factor for the residual oil in the East Texas field lies between 0.7 and 0.8, depending on whether the gas expansion be that of flash liberation or differential liberation. This is applied as a recovery factor in making estimates of ultimate recovery, and, of course, a corresponding factor should be applied to the Powell and Wortham fields.

In Table 5 there is given a comparison by Stanley Gill for the estimated ultimate recovery in the Van, East Texas and Powell fields. Estimates of ultimate recovery for the East Texas field have had to be moved upward for the past several years. Estimates compiled in 1935[22] are given in Table 9.

The highest figure in the early estimates for the East Texas field in Table 9 is that of Hudnall for 3,500,000,000 barrels and in view of the present outlook seems more in keeping with the recovery that will be obtained than the lowest estimates given. Harold Vance estimates[24] total ultimate recovery of the East Texas field from 100,000 acres to be 2,000,000,000 barrels. This estimate was made in 1932. "On basis of pressure decline, using the straight-line method only, we find an estimated recovery in excess of 1½ billion barrels." The writer cannot speak for other estimates, but will say that his own estimate of one billion barrels is very much short of that which will be recovered and was due to a considerable extension of the field from 100,000 acres to the present limit of about 136,000 acres; also to the reluctance to allow for more than an arbitrary estimate of 10,000 barrels per acre. In view of the diversity of estimates and to the changes in estimates as time has passed, it looks very much in a new field as if there is no method in use at present of estimating reserves that is likely to come within any reasonable degree of closeness to those that will actually be obtained.

The initial reservoir pressure of 1620 pounds per square inch in the East Texas field is now reduced to about 1000 pounds, and on basis of reduction in pressure, the field would seem to be about 38 percent depleted. However, this is not a safe basis for estimating recovery in this field, due to the restricted rate of production which allows an active water-drive partly to maintain the reservoir pressure. It is conceivable that a field with strong water drive could be produced at so slow a rate that even at the time when it is completely depleted, the reservoir pressure would be almost, if not altogether, as high as the initial reservoir pressure, and, therefore, at no time would the pressure give any indication of ultimate recovery.

In March, 1942, water production in the East Texas field was about 330,000 barrels per day compared with a production of 310,000 barrels of oil, which is a low percentage of water when compared with that which applied in the later stages of the Powell field, or in the Luling or Salt Flat fields, within a year after these two limestone fields were discovered.

Lack of uniform spacing in parts of the East Texas field inevitably lead to inequitable recovery of oil so far as property rights are concerned; also the severe restrictions of allowables which prevent the lease owners down the slope from recovering their oil in place before it is carried up by the water to wells higher on the structure along the "Fairway" is another phase of inequitable recovery of oil, and the term "legalized piracy" can be applied in the one case just as well as in the other.

After a sufficient number of years have passed to allow a more definite estimate of reserves to be determined, and when facts can be sifted from opinions and propaganda, it should become possible to reach a much better understanding of the mechanics of the underground flow of oil, and of the best methods of production applicable to such a great field.

This discussion of oil field recoveries will be continued in a second installment. It will present data on limestone reservoirs, California fields, Ordovician Wilcox sand, and comments on comparisons of recovery in fields described.

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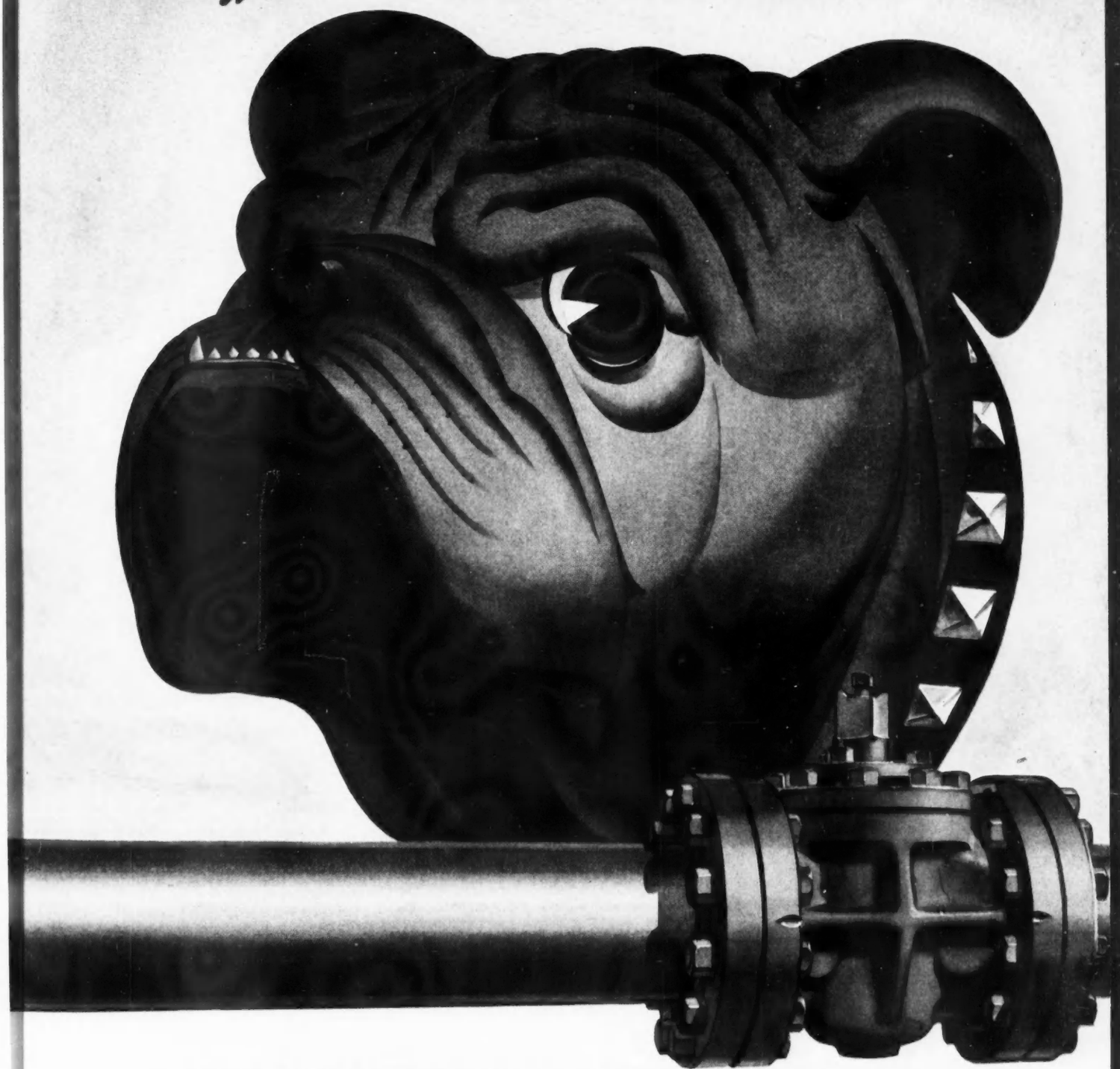

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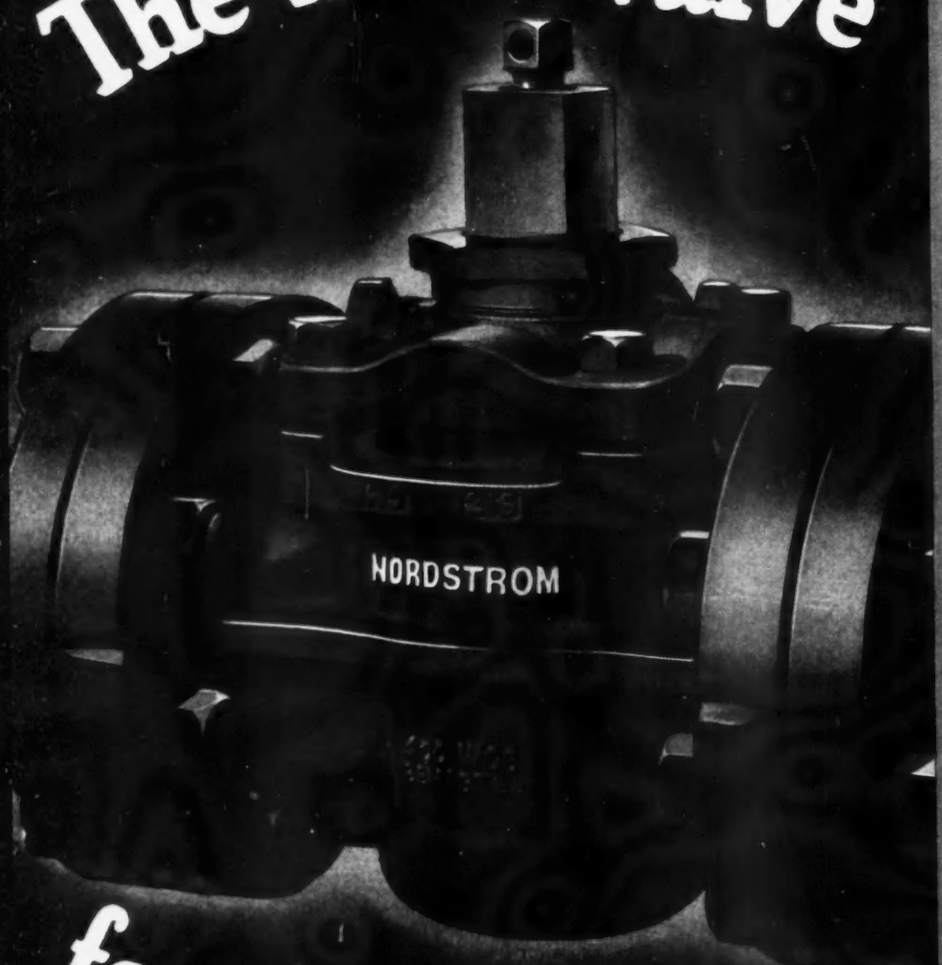

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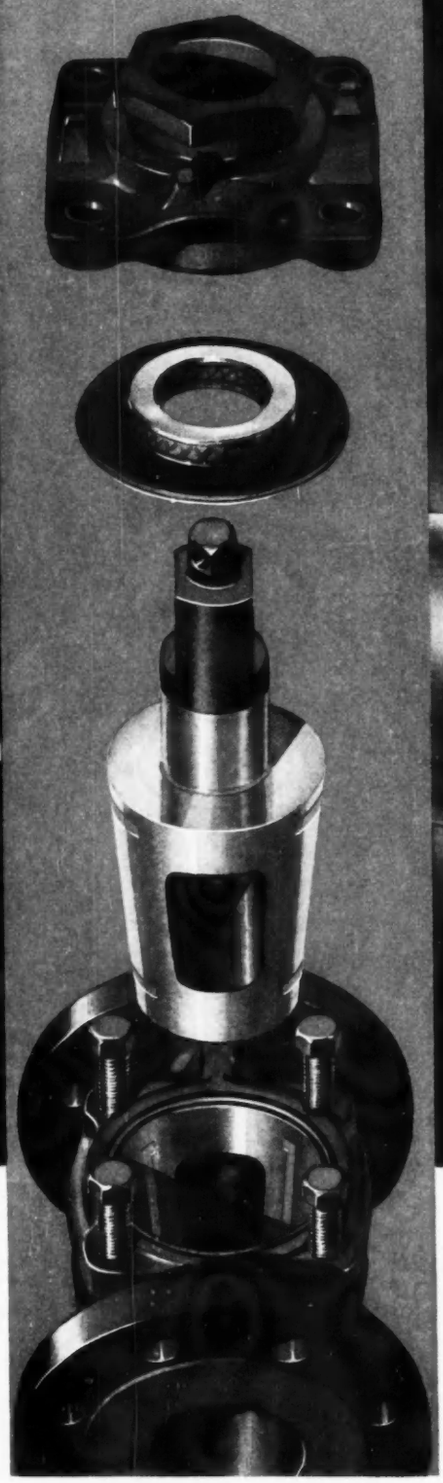

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[*Continued from page 12*]

country and that rationing "should preserve essential services and essential needs and not destroy the normal and necessary functions of our economy."

"The country," he said, "should be divided into regions or zones dependent upon the geography, distances between points, available transportation facilities, and all other factors, there is no sense in putting the whole country into the same straitjacket."

The Senator pointed out that states with congested populations such as Connecticut, have plenty of mass transportation facilities, and held they should be measured "by the same yardstick" as Texas, New Mexico and other states of the south and west, "where great distances intervene between towns and areas served by them, where many communities have no railroad or bus transportation whatever and where gasoline is readily and easily available from local supplies without impeding or placing a burden upon transportation of such gasoline supplies."

☆

JEFFERS REPORTS: National requirements for rubber at the close of 1943 will have reached a total of 577,000 long tons, against which a new supply of but 390,000 tons is in sight, requiring that 187,000 tons be taken from stocks, which at the end of next September will have dropped to 135,000 tons and will have increased only to 213,000 tons by the end of the year, it was disclosed December 4 by Rubber Director William M. Jeffers, in his first progress report.

Present indications, Jeffers said, are that the United States may go into 1943 with an inventory of crude and synthetic rubber of approximately 400,000 long tons, and "if it were not for other programs over which we have no control it seems probable that the accumulated production of synthetic and imports of crude rubber might be as much as 175,000 tons by September 30, 1943, and 390,000 tons by the end of 1943."

The control for these production estimates, he explained, are the ability to secure adequate priorities and proper allocations of fabricated components, the ability to complete synthetic plant facilities on schedule, and the rate at which the plants come up to full production.

"However," Jeffers added, "it is obvious that even if these production objectives are attained, the inventory of crude and synthetic rubber in the fall of 1943 will, to all practical purposes, be down to the absolute dangerous inventory dead line of 120,000 tons, and by the end of 1943 will have been built up to only 175,000 tons."

The situation he asserted, requires the continuance through the "critical fall of 1943" of a policy of rigid conservation of rubber and "we must envisage the possibility of a complete exhaustion at that time of even so-called normal inventories of finished products.

"In fact," he said, "a delay of a month in the part of the program which includes plants that should be finished by May 30 would mean the loss of 40,000 to 50,000 tons, at a time when there will be none to lose. Present indications are that the impact of competitive programs will cause a delay. It is too early to say how much of a delay."

Expansion of the rubber program, as recommended in the Baruch report, is being pushed and final arrangements have been made for a portion of recommended 100,000 tons a year additional capacity of butadiene from refinery conversions; studies are under way in the chemical branch of the War Production Board looking to the provision of additional facilities for making Buna S from grain and plans for building plants to make an additional 30,000 tons per year of that type are being worked out by the rubber director's technical staff, and the recommendation that additional styrene capacity be ready by January 1, 1944, is "being watched" but since construction of butadiene plants in the main program is behind that envisioned by the Baruch report, because of lack of materials, decision upon this increased capacity has been postponed.

Jeffers spoke bitterly of the "lack of public understanding" of the rubber situation and the need for gasoline rationing, and urged the need of more information to the public on these and related points.

Summarizing the situation, Jeffers said his office has been organized and staffed, working relationships have been established with other sections of the government and "serious problems" in connection with the work of OPA and ODT are being solved.

"However," he admitted, "the construction program is behind that envisioned by the Baruch committee, but if it were possible to settle questions of relative importance between programs, it should still be possible to obtain an even flow of components and to build the required facilities in time to prevent the inventory of crude rubber and synthetic falling below the disaster dead-line determined by the committee. Any further delay will make this impossible. Present indications are that, because of other programs, there will be such a delay."

☆

RUBBER: All sites for plants for the production of 800,000 tons of synthetic rubber annually have been chosen and necessary funds for construction allocated, it was disclosed by Senator Thomas of Oklahoma, December 2.

The Senator, a member of a Senate subcommittee which investigated the rubber situation some time ago, based his statement on advices from federal authorities that the preliminary work has been completed and the rubber program is about to get under way.

The schedule, he said, calls for 600,000 tons to be produced from petroleum and 200,000 tons from garin alcohol.

"That would be sufficient for imperative needs," Thomas commented. "Anyway, it's all they say they can produce.

"It will take some time for the plants to be built and the machinery to get going."

Thomas' statement followed by a day an executive session of the House Banking and Currency Committee at which Chairman Steagall of Alabama said Secretary of Commerce Jesse Jones stated synthetic production would reach a rate of "something like" 1,000,000 tons annualy by the end of 1943.

The committee meeting was for the purpose of considering a measure increasing the lending authority of the Reconstruction Finance Corporation by an additional five billion dollars. No details of the uses to which the additional authority would be put were disclosed, but in view of the discussion of the rubber program it is believed some of the money will be used on rubber plants.

On December 2, also, Senator Gillette of Iowa, chairman of a Senate agricultural subcommittee which earlier this year investigated the rubber program, announced that his group early next month will initiate an investigation of "powerful selfish petroleum interests" which he said are hindering Rubber Director Jeffers.

The interests aimed at, the Senator declared, are the same as those which blocked expansion of the program to produce rubber from grain alcohol.

"I think Jeffers is doing a good job," he asserted, "but his hands are being tied and obstacles of every description are being thrown in his way."

Hearings

[*Continued from page 12*]

he said. "All lines have been designed with the minimum use of critical materials. Shortage of material has meant that we have had to comb the industry for second-hand equipment, including pipe, pumps and tankage."

Under questioning, however, Parten admitted that OPC is now "getting quicker action than we got, say, two months ago."

Parten paid high tribute to the coop-

eration of the industry which, he said, is all that has made possible the successful prosecution of the OPC program.

To this, Representative Wolverton replied that much was due to Coordinator Ickes and to the excellent staff which he has built up, and expressed deep regret over reports that the coordinator was to be transferred to the Department of Labor.

"Without making any reflections upon other agencies," Wolverton said, "it is my experience over a period of years that no one has come before us with more definite information on subjects being considered than Mr. Ickes."

Major problems confronting the transportation system, Parten continued, are those of replacement parts and manpower. Tank-car movement already is suffering a 15-percent delay because of the bad-order cars and repair time necessary, and efforts are being made to develop repair shops at all termini to reduce the hazard of wrecks due to bad-order cars.

The manpower situation is especially critical in the truck end, and the recently imposed 35-mile speed limit has produced inefficiency in truck transportation. A complete study of that situation now is being made, and a report is expected sometime this month on the basis of which it is probable the OPC will ask the Office of Defense Transportation to raise the speed limit for oil carriers at least. The lower speed, he says, lowers the ability of the trucks to deliver but does not appear to save either gasoline or rubber.

Various phases of the transportation situation also were discussed by J. J. Pelley, president of the Association of American Railroads; John Lawrence of the American Trucking Association; and Henry F. McCarthy, director of traffic flow; E. R. Holzborn, director of the inland waterways division, and S. F. Niness, director of tank trucks, of the Office of Defense Transportaion.

OPC is aiming at securing industrial conversions from oil to coal which will save 80,000,000 barrels a year of heavy residual oils throughout the country, it was disclosed by Robert T. Collier, chief of the OPC marketing division.

So far, Collier said, conversions have been accomplished in District 1 which will save 27,709,000 barrels, with an additional 6,500,000 barrels to be saved by conversions now under way, but in District 2 conversions will save only about 4,500,000 barrels.

Home conversions have been less important, saving 4,200,000 barrels in District 1 but practically none in District 2.

Originally, he explained, it was estimated there was a potential saving of 37,000,000 barrels to be accomplished in District 1 if conversion was made mandatory. The War Production Board did not agree that force should be used, and may home owners contributed their grates and other coal apparatus to the scrap drive so that now the potential is but seven or eight million barrels.

"I think we have come to a point now where mandatory methods are going to be necessary in numerous instances," Collier said in discussing industrial conversions, adding that home conversions will be forced by the refusal of rations by OPA.

"As it looks to us, fuel oil is short throughout the entire country," he told the subcommittee.

OPC, he said, is planning programs which will save fuel oil, through use of colloidal coal-oil mixtures and the substitution of gasoline and distillate oils for residual in gas-making.

He explained that a mixture of 40 percent powdered coal and 60 percent oil could be used by engines without any change in their firing apparatus, but the plan cannot be put into extensive use before next winter by reason of the need for supplying crushing and other equipment for the prepartion of the coal.

Gas plants can use gasoline and distillates for enrichment of gas, but some changes in apparatus will be necessary. A possible saving of about 12,000,000 barrels of residual is seen in District 1 alone. Gas plants now are shifting from residual to distillates, and can save about 20 percent in the quantity of residual formerly used.

On December 4 Deputy Administrator Davies warned of further cuts in gasoline rations, in the northeastern states at least, as necessary to prevent people in New England from freezing to death this winter, and Rubber Director Jeffers admitted that the rubber program is behind the schedule recommended in the Baruch report with little probability that the lost time will be made up.

Davies discussed the situation at a meeting of the New England Congressional delegations, disclosing that later in the day he had a conference scheduled with WPB Chairman Nelson and Price Administrator Henderson on the question of a further cut in gasoline rations for holders of A cards as a means of diverting additional tank cars to the hauling of heating oils.

He declared there is still much nonessential driving, and members of the delegations recalled that Ickes had proposed a two-gallon unit to meet the shortage in East Coast supplies but Henderson had ordered a cut only to three gallons.

Actual deliveries of heating oils and not rationing ratios determine how much oil is provided to New England householders, he explained, adding that while it has been hoped to provide 75 percent of last year's deliveries the actual situation is dependent upon military needs.

"We have estimates for months and years ahead but they change from day to day," he said. "We have had some shocks along this line in the last few days."

Davies disclosed that PAW is prepared to insist that oil supplies be denied householders who can convert to coal, and said the situation is so serious that some New Englanders may freeze to death if the problem is not solved.

"Freezing to death is more than a figure of speech," he said. "Unless a good job is done it could and would happen in New England."

Presidential Order

[*Continued from page 10*]

mended by the Administrator for allocation by the War Production Board.

d. Subject to the direction of the Chairman of the War Production Board, exercise the powers, authority, and the discretion conferred upon the Chairman by Paragraph 1 of Executive Order No. 9125 of April 7, 1942, by issuing, and taking appropriate action to enforce, such orders or directives to the petroleum industry as the Administrator may deem necessary, in order to:
   (1) Provide adequate supplies of petroleum for military, or other essential uses; or
   (2) Effect the proper distribution of such amounts of materials as the Chairman of the War Production Board may allot for the use of the petroleum industry.
e. Compile data and make continuing surveys with respect to the effect of the prices charged for petroleum upon the efficient wartime operations of the petroleum industry and the maintenance of adequate supplies of petroleum for war and essential industrial and civilian uses. On the basis of such surveys, the Petroleum Administrator shall consult with and recommend to the Administrator, Office of Price Administration, such upward or downward adjustments in the schedule of prices charged for petroleum as will, in the judgment of the Petroleum Administrator, assure the efficient wartime operation of the petroleum industry and the maintenance of adequate supplies of petroleum for war, and essential industrial and civilian uses. In order to enable the Petroleum Administrator to make appropriate recommendations, the Price Administrator shall advise with the Petroleum Administrator prior to the establishment or alteration by the Price Administrator of any schedule of prices to be charged for petroleum.
f. Be advised of all plans or proposals which deal with the civilian ration-

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In Gulf offices everywhere—in its refineries, in its laboratories—the Gulf guarantee is a constant reminder of an obligation to those we serve.

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This emblem ON ANY PRODUCT STANDS FOR TWO GUARANTEES OF EXCELLENCE, ONE VISIBLE, ONE INVISIBLE.

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AGAIN Democracy is fighting for decency! Gulf, in common with all of the Petroleum Industry, is completely and wholeheartedly bending all of its energy to the winning of a victorious peace.

In following this course, there may be times when service to our customers will be affected by governmental restrictions which we have cheerfully accepted. We want you to know, however, that the purpose and the spirit behind the Gulf emblem will carry on.

GULF OIL CORPORATION · GULF REFINING COMPANY

ing of petroleum and consult with rationing authorities in the development of such plans or proposals; and, in those instances where rationing is for the purpose of maintaining adequate supplies of petroleum for war and essential industrial and civilian requirements, determine, after advising with the War Production Board, the areas and the times within which such rationing should be effective and the amount of petroleum available for such purpose.

g. Consult with the War Shipping Administration with respect to the assignment of tankers and the movement of petroleum, and, subject to the requirements of the Departments of War and the Navy, recommend allocations as between units of the petroleum industry of available tankers under the control of the War Shipping Administration.

h. Designate the quantity and kind of petroleum to be shipped and received by those engaged in the petroleum industry, and certify such designations to the Office of Defense Transportation for appropriate action in providing the necessary transportation.

i. Review all plans or proposals for the construction, extension, enlargement or interconnection of petroleum pipe lines; subject to the over-all responsibilities of the Office of Defense Transportation, approve such plans or proposals as are, in his judgment, necessary to provide adequate supplies of petroleum for war and other essential uses and recommend to the War Production Board programs covering the amounts and kinds of materials needed for such pipe lines. The Administrator shall direct the physical operation of petroleum pipe lines to the extent of prescribing the quantity and kind of petroleum to be transported by and the direction of flow through such pipe lines: *Provided,* that nothing herein shall be deemed to limit the functions and authority of the Office of Defense Transportation under Executive Order No. 8989 of December 18, 1941, with respect to the provision of necessary additional transportation facilities and equipment, or to coordinate and direct domestic traffic movements.

j. Advise the several Federal departments and agencies concerned with the construction, enlargement, or additional interconnection of any natural gas transmission line as to the supply and availability of natural gas at the proposed sources of production whenever such construction, enlargement, or interconnection will result in substantially altering the rate of production at such sources.

k. Perform the duties and responsibilities with relation to petroleum and the facilities used in the petroleum industry imposed by Executive Order No. 9165 of May 19, 1942, upon the Department of the Interior.

l. Certify to the various State regulatory bodies having jurisdiction with respect to the production of petroleum, the amounts and kinds of petroleum which should be produced in their respective States, and collaborate with such State regulatory bodies in the coordination of their activities with the programs and policies of the Administrator.

m. Keep the President informed with respect to the progress made in carrying out this order and perform such related duties as the President may from time to time assign or delegate to him.

4. The Administrator shall collaborate with the appropriate Federal departments and agencies authorized to determine plans and policies with respect to foreign petroleum activities. The Administrator shall, in conformity with such plans and policies, issue directives concerning the physical operations of their foreign petroleum facilities to units of the American petroleum industry which directly or indirectly engage in such operations in foreign countries. The Administrator shall be the channel of communication on foreign petroleum matters between the Federal departments and agencies and such units of the American petroleum industry.

5. The Administrator shall perform the functions with respect to rubber conferred upon the Office of Petroleum Coordinator for War by Executive Order No. 9246 of September 17, 1942, subject to such directives as the Rubber Director may issue pursuant to such order. Nothing in this order shall apply to or in any way limit the functions and authority, or the manner of executing the same, of the Chairman of the War Production Board or the Rubber Director in the exercise of control over and administration of the Nation's rubber program pursuant to said Executive Order No. 9246, or the functions and authority of any department, establishment or agency in the execution of such aspects of the rubber program in such manner and for such period of time as the Rubber Director may direct pursuant to said Executive Order.

6. Subject to such restrictions as may be imposed by the Departments of War and the Navy with respect to their own requirements, the several Federal departments and agencies shall supply such information and data as the Administrator may require in performing his functions and shall advise with the Administrator before undertaking any action which might affect the continuous, ready availability of petroleum for military and essential industrial and civilian needs. In order to assist him in carrying out the purposes of this order, the Administrator may establish or designate committees or groups of advisors, representing two or more departments or agencies of the Federal Government, or States. The Administrator shall meet at regular and special intervals with representatives of the various Federal departments and agencies having continuing functions directly related to petroleum or the petroleum industry.

7. The Administrator may appoint, with the approval of the President, a Deputy Administrator, who shall report directly to the Administrator, and to whom he may delegate any and all power, authority, and discretion conferred upon him by this order. The Deputy Administrator shall serve as Acting Administrator in the absence of the Administrator. The Administrator, within the limits of such funds as may be allocated or appropriated for the purpose, may employ necessary personnel and make provision for necessary supplies, facilities, travel, and services.

8. The Office of the Petroleum Coordinator for National Defense, later changed to the Office of Petroleum Coordinator for War, established by the letter of the President dated May 28, 1941, is abolished, and its personnel, records, property, and funds are transferred to the Petroleum Administration for War, effective fifteen days from the date of this order. All orders, directives, agreements, recommendations, and other documents issued or entered into under the functions, duties, and authorities of the Petroleum Coordinator for War shall remain in force as the responsibility of the Administrator until such time as he may revoke, alter, or otherwise change such documents under provisions of this Executive Order.

9. Nothing in this order shall be deemed to limit in any way the authority of the Departments of War and Navy to initiate or carry out directly, without review or approval by the Administrator, any action relating to petroleum or the petroleum industry which either Department deems to be a matter of military necessity or expediency and which arises in such areas and is of such military urgency as to require special or secret disposition; or to limit in any way the functions and authority of the Secretary of State, under the direction of the President, in the formation of the foreign policy and the conduct of the foreign relations of this Government; or to limit in any way the statutory powers of the Interstate Commerce Commission with respect to rates, charges, statistics, accounts, car service (including emergency service powers) or operating authority; or to limit in any way the exercise of the authority of the Federal Power Commission or the performance of its functions and authority under the Natural Gas Act (52 Stat. 821) as amended; or to limit the functions and authority of the Board of Economic Warfare under the Act of June 30, 1942 (56 Stat. 463); or to limit in any way the powers of the Price Administrator under the Emergency Price Control Act (56 Stat. 23) and as amended by Public Law 729—77th Congress, Second Session.

10. Any provisions of pertinent Executive Orders in conflict with the provisions of this order are hereby superseded: *Provided,* that nothing herein shall be deemed in any way to limit the functions and authority of the Chairman of the War Production Board under Executive Orders No. 9024 of January 16, 1942, No. 9040 of January 24, 1942, No. 9125 of April 7, 1942, and No. 9246 of September 17, 1942; or to limit in any way the functions and authority of the Federal Power Commission under Executive Order N. 8202 of July 13, 1939; or to limit in any way the functions, duties, or authority of the War Shipping Administration with respect to the operation, control, purchase, requisition, charter, repair, use, or insurance of any vessel or cargo; or to limit the functions and authority of the Board of Economic Warfare under Executive Orders No. 8839 of July 30, 1941, as amended, No. 8900 of September 15, 1941, No. 8926 of October 28, 1941, No. 8942 of November 19, 1941, and No. 9128 of April 13, 1942; or to limit the functions and authority of the Office of Lend-Lease Administration under Executive Order No. 8926 of October 28, 1941.

FRANKLIN D. ROOSEVELT.

The White House,
December 2, 1942.

DON'T DO THIS TO YOUR VALVES!

Don't use a long lever and strong pull on any screwed joint, either. Avoid twisting the valve, by using a short lever and a few hammer taps.

The bodies of valves designed for oil industry use are strong, but they are not designed to stand the strains that would be imposed on them if you permitted anyone to use a wrench on the hex farther from the joint. That sort of handling may well result in a twisted body—and a useless valve. . . . Tremendous war production—the great ship-building program, huge increases in requirements for aviation gas, and the new importance of petroleum to synthetic rubber production—have all combined to make it imperative to guard the valves you now have—to install and service them with great care.

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—*President Roosevelt*

EVERYBODY EVERY PAYDAY 10%

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New Goal for Payroll Savings Plan!

Along with increased war production goals go increased costs and extra billions which must be raised, and raised fast, to win this war. That means we must raise our sights all along the line, with every firm offering every American with a regular income the chance to buy more *War Bonds*. YOUR help is asked in encouraging employees to put at least 10 percent of their pay into War Bonds every payday, through the Payroll Savings Plan. For details of the Plan, approved by organized labor, write, wire, or phone Treasury Department, Section T, 709 12th St. N. W., Washington, D. C.

U.S. WAR SAVINGS BONDS

This space contributed to America's All-Out War Program by

THE OIL WEEKLY

Tough Job

[*Continued from page 13*]

the flow of critical materials into the various manufactured products necessary to the war program. It is called the Controlled Materials Plan and has as its purpose the assurance of a balance between supply and demand for controlled materials to the end that such materials shall be available in the quantity and form and at the time required to meet authorized programs and schedules. It provides for specific allotments of materials for various uses.

The details of the plan have not been entirely worked out, but in general the plan is intended to function in the following manner: Estimates of the amount of the material required for the manufacture of the necessary equipment will be submitted to the War Production Board by the various industry groups. OPC will perform this function for the petroleum industry. Upon receipt of the total estimated material requirements, the War Production Board will then attempt to balance the requirements against the supply, and make definite allotments of material to each agency. Proportionate allotments will then be made by the agencies to the manufacturers to use in making the necessary equipment. In brief, the Controlled Materials Plan is designed to provide definite allotments of controlled materials for specific uses. It is hoped, therefore, that it will provide assurance that necessary equipment can be manufactured and put into use in the amounts equal to the allotment for that type of equipment. The allotment of material will be applied to the manufacturer, and consumers will continue to obtain their requirements from the manufacturer in a manner somewhat similar to that which has been followed in the past. One of the primary aims of the Plan is to insure a balanced production of different types of equipment.

The transition during the next few months from the present Production Requirements Plan to the Controlled Materials Plan will no doubt be "hectic"; but the new plan is the most direct one yet proposed, and, while it leaves some things to be desired, there is much merit in it. It will mean *allocation* in place of *priorities*—a *certified check* in place of a *hunting license*.

With the thought in mind that it might help some of you to expedite procurement of materials prior to the issuance of the Controlled Materials Plan, I would like to mention a few details concerning the filing of material applications that might save you some time. At the present time, preference ratings up to and including A-1-a ratings can be obtained on applications filed under P-98b. Several types of equipment may be included on the same application, if desired. Applications filed under this order do not require individual analysis by the War Production Board, but are processed entirely by the OPC.

Some critical materials require higher preference ratings than can be obtained on Form P-98b, and application for this type of material should be filed on Form PD-1A, upon which preference ratings up to and including AA2X may be obtained. The main classes of material for which it is necessary to make application on Form PD-1A are:

(1) Tubular goods, which require an AA-3 rating.

(2) Engines of over 50 horsepower.

(3) Technical instruments and electrical equipment.

Since these applications must be analyzed by the appropriate material branch of the War Production Board, they should include only one particular class of equipment, and should be addressed to the Director of Industry Operations, War Production Board.

Any application for material should be accompanied by a letter giving as much supporting data as possible on the need for the equipment. Since these applications must be reviewed and analyzed on the basis of their merit and urgency, the statement submitted with the application should provide sufficient details as to the proposed use of the material and its urgency and importance to allow it to be fairly judged. All such letters should indicate routing to the Materials Division, OPC.

In conclusion, I would like to emphasize one very important point. While the Office of Petroleum Coordinator for War is going to do its level best to obtain for you the materials you need, it is apparent that available supplies will be limited. The task of maintaining an adequate supply of petroleum will have to be accomplished by the use of a very minimum amount of material. So I urge every one of you to do your part in conserving equipment.

Extra precautions in the care, maintenance, and proper repair of all equipment may add materially to its working life. Idle equipment should be put to use. If you can not use it yourself, make it available to other operators. The possible use of substitutes for critical materials should be investigated. I might mention in that connection that our imports of manila hemp have been entirely cut off. I know that many of you are already using substitutes in its place, but even further steps in this direction appear necessary. All these things may appear small, but their widespread adoption will add considerably to the working supplies of the oil industry.

The oil industry, I repeat, has a tough job ahead, but it is a job that must be done—so let's do it, let's keep 'em flying.

WAR COMES FIRST!

Here at Mission as well as in every plant throughout the nation, war comes first. Mission is putting into war work the same engineering skill, the same precision technique, the same ability to meet and beat schedules that has made Mission oil field products leaders.

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BUY BONDS FOR VICTORY and to insure a strong and stable government when the war is over.

PRACTICAL OPERATING *Hints* FOR

THE practical operating hints for the drilling rig, production man and pipeliner, appearing regularly in these pages, are secured from oil operations everywhere and offer suggestions that will help to improve operating efficiency and safety.

The items give an excellent picture of the remarkable ingenuity being exercised by the operating divisions of the industry. Contributions to these features will be paid for at the rate of $5 for each illustrated item accepted. Address contributions to "The Editor, The Oil Weekly, Houston,"

1. LUBRICATION

Irreversible Canting Prevents Oil Waste

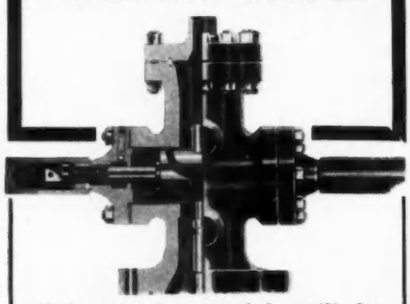
Utilizing scrapped automobile steering gears to provide positive setting of drums enables close control of amount of oil withdrawn and eliminates splashing and spilling of uncontrolled unit.

AN OIL drum rack built a little more on the elaborate side can be constructed with almost the same ease and outlay of cash as a makeshift installation and will make it much easier to fill a can of oil. A skid type base is the foundation with A frames at each end and at as many intervals as the number of drums required.

The hanger for the individual drum is made of pipe and a bar of iron at the bottom is shaped to fit inside the chime. The upper end is adjustable with lugs on the cross bar which fit inside the chime. The side pieces slide inside larger pipe and are locked with set screws after the drum has been set in the frame.

Each individual frame has part of a light weight steering gear from a wrecked car attached to the top of the A frame and to one of the gudgeons of the tilting member. A short crank attached to the steering post provides the means for tilting the drum to any position from vertical to horizontal, and keeps the drum in that position until changed by reverse cranking of the modified steering gear.

RECTOR
ROUND RAM
TUBING HEAD



Tubing may be suspended on (1) the rams, by means of a special recessed tubing coupling, threaded for back pressure valve; (2) on mandrel in bowl above rams; (3) on slips in bowl above rams. In some areas a stripper may be used to run tubing with the rams in the open position. Your composite catalog has complete details.

STOCKS OF ALL TYPES AND SIZES OF RECTORHEADS ARE AVAILABLE FOR IMMEDIATE DELIVERY.

RECTORHEAD
"MAKING THE OIL INDUSTRY SAFER"

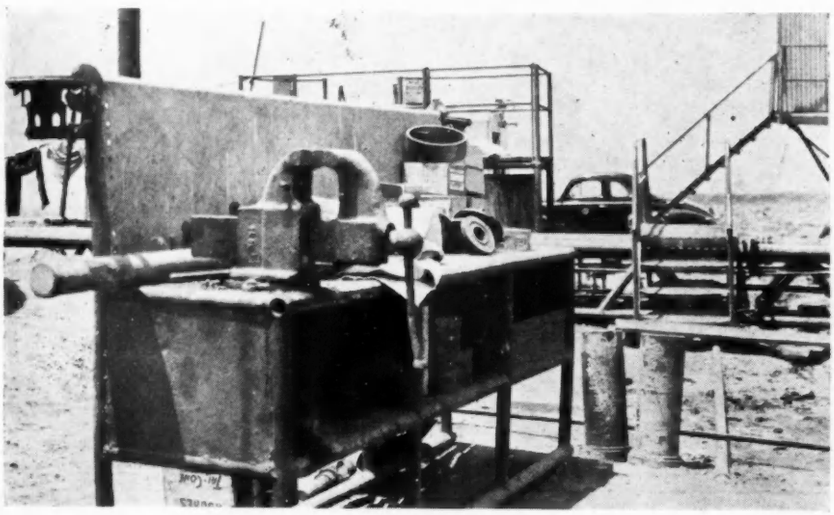
2. WORK BENCH

Combination Storage And Working Unit

WHEN weather conditions permit work in the open air, and a work bench is required with a vise to hold material being repaired, a steel bench is used with success by one company.

The bench has horizontal supports on the ground made of 2-inch pipe acting as a skid base with risers welded at intervals running to the top of the bench on the working side, and to the top of the back on the opposite side. Compartments are provided for mud pump pistons and wrenches with smaller bins for packing.

A heavy vise is bolted over one corner of the bench so that piston rods can be held stationary while work is being done on the plungers and other parts. A stiffening bar at the top of the back is

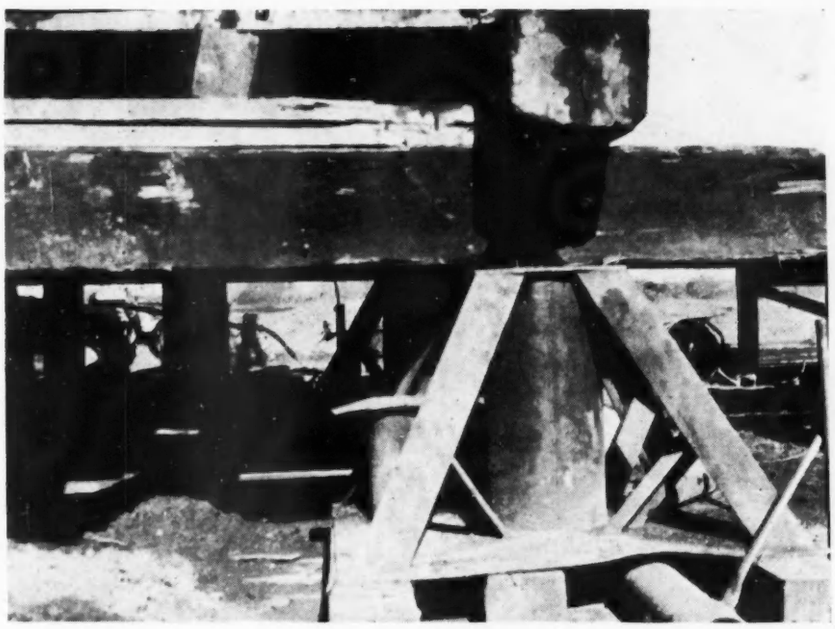


Fabricated from scrap 2-inch pipe and bits of tank plate, with partitions providing requisite bracing, this portable bench withstands heavy rig service and is readily transported on truck.

made of two-inch pipe, with the ends open, which is used conveniently to place the handles of light pipe dies to keep them off the ground. The stiffening bar extends outward from the back a sufficient distance so that pipe cutters can be hooked over the end so they will be ready for use when required.

3. DERRICK PIERS

Prefabricated Units Replace Loose Cribs



Combining scraps of boiler or heavy tank plate with short lengths of pipe and scrap derrick angles to form a unitized and portable sub-base for derrick corners reduces danger of corner failure.

WHEN corner piers are desired to support the derrick instead of timber cribbing, a few pieces of junk pipe and boiler plate can be used to build a set which can be used any number of times without wearing out.

A large piece of flattened boiler, or tank steel is obtained and a two-foot, or so, pipe nipple welded in the center as the principal supporting member. Forty-five degree bracing is obtained with four pieces of angle iron properly shaped to fit into the angle, and to a small cap plate above the top of the large pipe nipple.

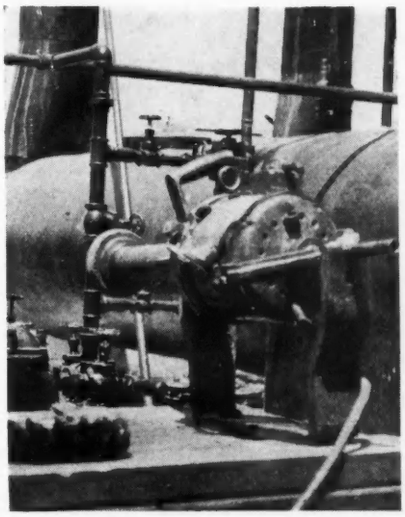
Additional bracing is obtained with short pieces of angle iron running from the base of the vertical pipe nipple to the long outside braces. A plank mat can be laid on the ground upon which the corner piers are placed with the height or leveling adjusted by using pieces of 4 x 4's or 6 x 8's.

4. HAND TOOLS

Support Adds Scope To Drill Usability

A HEAVY electric drill may be converted to a grinder by putting on appropriate connections and an extension sleeve over the driving shaft. This machine may be moved to any place needed, but to fit it for stationary service on one end of the work bench, a cradle has been devised as a support and receiver for the tool.

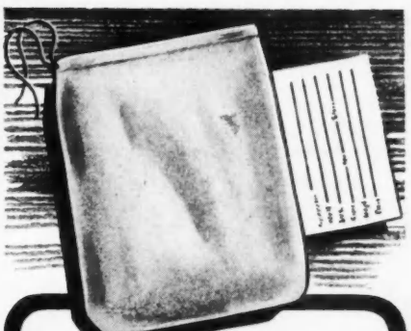
Heavy bar iron is shaped in a forge to bolt on the bench leaving both ends upright. Each end is formed for the particular end of the motor housing,



Formed bracket, bolted to work bench, supports drill in position to utilize attached grinder.

a large notch for the shaft sleeve, and a smaller one for the breast yoke.

The tool is heavy enough so that light grinding can be done without locking the tool in place over the notches, and is sturdy enough to absorb any vibration.



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DEEP WELL PLUNGER PUMPS AND SUCKER RODS

The Week's News

Two Suits Attack Water Order in East Texas

Two suits attacking the water-oil ratio order in the East Texas field have been filed in Travis County District Court. In each case operators contended that their wells were marginal and therefore production could not be curtailed.

Konowa Operating Company et al, filed the first suit, and the second was filed by Roosth and Genecov et al. Approximately 180 wells were involved in the suits. A hearing was scheduled originally for December 4, but the hearings in both cases were postponed after the Texas Railroad Commission announced that the order would be held in abeyance pending potential tests of the wells involved.

The tests were ordered by Commission Chairman E. O. Thompson soon after the suits were filed. The purpose of the test is to determine the exact amount of oil and water each well can produce in 24 hours.

In order that all operators would be treated alike, Thompson said that the water-oil ratio order, scheduled to become effective on December 1, would be held in abeyance until all wells involved in the suits were tested. He estimated commission engineers would be able to test about five wells daily, which indicates a minimum delay of 36 working days. This would mean that the water-oil ratio order will not become operative before January 15, at least.

Meanwhile it appeared that the commission would have more time to regulate the water situation, at least so far as being able to supply oil to the big-inch line is concerned.

Buttram Reviews War Effort and Oil Situation

In meeting at Tulsa, December 2, Independent Petroleum Association of America, heard Frank Buttram, president, discuss the current position of the petroleum industry in relation to both the association and as to the war effort. He emphasized the importance of obtaining a working parallel between industry and front line activity, and stressed measures necessary of adoption to guarantee uninterrupted effor on both the home and fighting fronts.

Buttram called attention to the state of the world conflict a year ago, at which time the Axis was striking well into many lands with apparently undeminished power, and compared that year-ago picture with the scene today when we are hearing of terrific blows being dealt the opponent from every front. He admitted that this is the time for rejoicing, but definitely held at the same time that it was no time for relaxation. Now, he said, it will be more than ever necessary to rush more material and foods to the war fronts.

To assure the continuation of this effort he suggested the adoption of some means of percentage distribution of the essential materials so that no effort either in industry or on the war front would be neglected or held back through un-proportionate allocations. This could well be accomplished by a scheduled placement of materials. Synchronized effort of all contributing factors is vital now and from now until the successful termination of the war.

In the oil industry it was suggested that there exist three shortages: manpower, materials and price, the latter being unreasonably lower than any other commodity although a prime essential to the war picture. While the demand for oil and its products is constantly increasing, producing and other facilities are not being expanded and it may be that the industry will pass the point of its ability to satisfy demand by the first of the year. This is at least partially due to restrictions making it impossible for some operators to function. He pointed out that producers are not making the profits credited to them by some federal employes in Washington, and suggested that in actuality, they made less profit than banks. He decried the offer of a subsidy as against the very foundation of enterprise, and firmly held for a price adjustment. He finished his remarks by glancing into the future to forecast a tremendous air travel and a new, three-dimensional age in which air-traffic would rule.

Van Vleck, field manager for the association, spoke of the purpose of the meeting, the first of a series, as being threefold. It would provide a means to trade current opinion; to discuss the program for the year and to arrange the financial support necessary to carry out the planned 1943 program.

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Texas Statewide Hearing Set for December 16

The Texas Railroad Commission has scheduled its next statewide hearing for December 16 at Austin.

This will be the first hearing since the commission ordered water-oil ratio allowances for East Texas. Undoubtedly operators will offer some evidence concerning this new order. Proponents of the plan to transfer allowables are expected to present more information about their situation and urge the use of this plan either as a substitute for or a supplement to the water-oil ratio order.

December Crude Demand 3,929,000 Barrels Daily

December demand for motor fuel will be 17 percent below that in the same month last year but demand for crude oil will be but 3 percent less, it was forecast December 3 by the Bureau of Mines.

Basing its figures on the reduction of the refinery yield of gasoline from 45.74 percent in December, 1941, to 37 percent this month, the bureau estimated that to meet the domestic gasoline demand of 47,100,000 barrels, plus exports, fuel use and losses of crude will require a supply of 121,800,000 barrels of crude, or 3,929,000 barrels daily, a figure only 115,000 barrels below the actual supply a year ago.

The bureau foresaw a further substantial reduction in gasoline demand as a result of the extension of rationing, but warned that it might be less than expected because of the previous voluntary curtailment of driving.

"The extension of gasoline rationing and the reduction in the A-card allowance in District 1 should result in a further substantial reduction in the demand for motor fuel," it said. "However, it should be borne in mind that the use of civilian vehicles has already declined sharply in unrationed areas, that the relative percentage of essential driving is higher in the winter months, and that a greater proportion of passenger-car operation may represent shorter trips under traffic condition that reduce the mileage obtainable per gallon.

"'The immediate effect of the rationing of heating oils and conversions by industrial users of residual fuel can not be accurately estimated," it added. "Consumption of residual fuel oil in the East Coast area has declined substantially but further reductions may be offset by increased consumption in other districts and by war requirements. It seems probable that the total demand for fuel oils may not be reduced much below the high levels of last winter."

Another factor which cannot now be clearly evaluated is that of increasing military and export requirements, nor can the results of possible further dislocations in transportation be foreseen.

However, the bureau found, as a result of the diverse trends involved, total demand for all oils in the third qquarter of the year was about 8 percent less than in the corresponding period of 1941, the major factor being a decline of about 16 percent in total gasoline demand. It is anticipated that this rate of decline in the total demand for all oils may continue through the current quarter and the first quarter of next year, but it is pointed out that the total demand for all oils reached an all-time peak in the last two quarters of 1941 and the first quarter of 1942.

The bureau reported that daily average crude production during the four weeks ended October 31 was 3,894,000 barrels and total runs to stills 3,746,000 barrels, with an average decline of 74,000 barrels daily in domestic crude stocks, indicating a demand for domestic crude of 3,968,000 barrels, and that data available for November indicate a continuation of the crude demand at approximately the same level.

In setting the December demand for motor fuel at 47,100,000 barrels, it was explained allowance was made for the further limitation of automobile use under nation-wide rationing but, because the amount of

forward buying during October and November can not be calculated closely enough to estimate its influence and December and subseqquent demand, little allowance can be made for the effect of advance accumulation of stocks in anticipation of rationing.

Stocks of finished and unfinished gasoline amounted to 78,146,000 barrels on September 30, and American Petroleum Institute statistics indicate a decline of about 1,250,000 barrels during October, which would leave approximately 76,900,000 barrels on October 31, or about 5,400,000 barrels less than inventories on the same date last year, the report showed. The bureau estimates an increase of 2,200,000 barrels in finished stocks during December.

Direct sales of natural gasoline are estimated at 1,700,000 barrels, making an indicated refinery production of 47,600,000 barrels, distributed among the various refining districts as follows: East Coast, Inland Texas, Texas Gulf Coast, Louisiana Gulf Coast and Inland Louisiana-Arkansas, 20,830,000 barrels; Appalachian, 1,970,000; Indiana, Illinois, Kentucky, etc., 10,690,000; Oklahoma, 2,580,000; Kansas, 2,810,000; Rocky Mountain, 1,310,000, and California, 7,410,000.

Natural gasoline to be blended at refineries is estimated at 5,050,000 barrels, and a yield of 37 percent is considered the maximum if sufficient fuel oils are produced without adding excessive quantities to motor-fuel stocks. The application of that yield ot straight-run and cracked gasoline production of 42,550,000 barrels gives total crude runs of 115,000,000 barrels, or 3,710,000 barrels daily, and, with crude for export and to be used as fuel, and losses, estimated at 7,100,000 barrels, gives an estimated demand for domestic crude of 121,800,000 barrels, or 3,929,000 barrels daily.

State Allowables Above Federal Figure

Production of crude oil and other petroleum during December probably will be around 130,000 barrels per day in excess of output recommended by the petroleum coordinator — an excess of approximately 4,000,000 barrels for the month. This is indicated by data on allowables prescribed in the 8 prorated states and current trends of producing ability in Illinois and Mississippi, unprorated flush production states. Pertinent details are presented in the accompanying table.

The indicated net overproduction will result from output above the recommended rates in Texas and Mississippi, which will be partially offset, however, by likely underproduction in California, Oklahoma, Illinois, and miscellaneous other states.

Crude Shortage Exists, Truman Committee Told

A crude-oil shortage exists in the United States but actual figures about the deficit cannot be divulged, government witnesses told Senator H. S. Truman's Wartime Investigating Committee at a hearing at Kansas City December 3.

E. B. Swanson, director of research for OPC, said crude oil in storage had dropped more than 35,000,000 barrels in the past year in the area east of the Rockies. He blamed a shortage of transportation facilities to the East Coast and emphasized that reduced consumption is the only way the problem can be met.

Wirt Franklin, director of production for District 2, OPC, testified that a slump in drilling and exploration also was a major cause for the crude shortage. He declared wildcatting was at a comparative standstill since many necessary materials could not be procured.

Charles E. Johnston, chairman of the Western Division of the American Association of Railroads admitted that trains can move more oil to the East Coast but said that unloading facilities in the East cannot handle heavier shipments.

Senator Truman, said that rationing of fuel oil in the Mid-West could be vastly improved with a little horse sense.

Petroleum Production in Excess of OPC Recommendation Indicated for December Under Scheduled Allowables

(Barrels daily of crude oil, condensate, natural gasoline, and other petroleum liquids)

STATE	Recommended Total Petroleum Production in November (OPC Schedule)	State Allowable of Crude in November	Actual Production in 4 Weeks Ended Nov. 28			Difference of Actual Crude Production from Allowable in November	Excess or Deficiency of Actual Total Production in November	Recomended Total Petroleum Production in December (OPC Schedule)	[8]Actual Production in Prospect for December, as Scheduled in Allowables or Forecast by Trends in Unprorated States			Excess or Deficiency of Total Actual Production Indicated for December
			[1]Crude Oil	[2]Natural Gasoline and Other Products	Total Petroleum				Crude Oil	Natural Gasoline and Other Products	Total Petroleum	
Prorated States:												
Arkansas	77,200	74,400	73,950	2,959	76,909	— 450	— 291	77,300	74,885	2,200	77,085	— 215
California	782,000	738,000	731,150	42,389	773,539	— 6,850	— 8,461	815,000	771,100	43,900	815,000	[5] .....
Kansas	300,700	302,000	296,250	5,145	301,395	— 5,750	+ 695	300,700	295,500	5,200	300,700	.....
Louisiana	333,800	309,800	324,350	20,492	344,842	+14,550	+11,042	326,100	300,100	26,000	326,100	.....
Michigan	64,500	62,800	61,900	126	62,026	— 900	— 2,474	63,800	63,675	125	63,800	.....
New Mexico	100,600	94,600	97,900	5,988	103,888	+ 3,300	+ 3,288	99,700	93,700	6,000	99,700	.....
Oklahoma	407,500	377,500	363,800	30,160	393,960	—13,700	—13,540	403,900	373,900	30,000	403,900	[6] .....
Texas	1,381,000	1,340,723	1,375,700	104,925	1,480,625	+34,977	+99,625	1,350,400	1,372,859	114,000	1,486,859	[4]+136,459
Total 8 Prorated States	3,447,300	3,299,823	3,325,000	212,184	3,537,184	+25,177	+89,884	3,436,900	3,345,719	227,425	3,573,144	+136,244
Unprorated Flush States:												
Illinois	280,900	.....	256,350	9,407	265,757	.....	—15,143	274,100	[3]255,000	[3]9,000	264,000	— 10,100
Mississippi	50,000	.....	64,600	.....	64,600	.....	+14,600	50,000	[3]62,000	.....	62,000	+ 12,000
Total 10 Flush Production States	3,778,200	.....	3,645,950	221,591	3,867,541	.....	+89,341	3,761,000	3,662,719	236,425	3,899,144	+134,144
Other States	253,200	.....	231,200	11,675	242,875	.....	—10,325	254,900	[3]230,000	[3]11,500	[3]241,500	— 13,400
Total United States	4,031,400	.....	3,877,150	233,266	4,110,416	.....	+79,016	4,015,900	3,892,719	247,925	4,140,644	[7]+124,744

[1] Data by American Petroleum Institute.

[2] Approximate; being same as output reported for September by Bureau of Mines.

[3] Estimate based on recent trends of production.

[4] Actual overproduction will be about 25,000 barrels above this indicated excess, thereby amounting to about 161,500 daily, in event of repetition of experience in November, when indicated excess was 74,279 but actual about 99,625.

[5] Although December allowables conform with recommended production, actual output of crude will be around 7000 barrels below allowable, if November experience is repeated. Even greater underproduction may occur in view of fact allowable raised 33,100 barrels for December, following 15,000-bbl. boost for November over October.

[6] Although December allowables conform with recommended production, actual output of crude will be around 14,000 barrels under allowable if November experience is repeated.

[7] Actual overproduction in United States may be around 130,000 barrels daily, considering circumstances given in footnotes 4, 5 and 6, on Texas, California, Oklahoma.

[8] Under state proration orders, allowables generally cover crude only but take into consideration expected output of other petroleum liquids, so that all production will conform with OPC recommendation. Actual crude production has been falling short of allowable in California and Oklahoma but has been close to allowable in other states. Details on state allowables for December include the following:

Arkansas: Crude oil allowable set at 74,885 barrels daily; natural gasoline output estimated at 2200.

California: Figures here given for December are allowables as scheduled by Conservation Committee of California Oil Producers. However, official November crude allowable was underproduced about 6850 barrels, and December allowable is nearly 33,100 barrels above that of November.

Kansas: Allowables here given are subject to final approval by Kansas Corporation Commission.

Louisiana: Figures here given are not allowables but actual production contemplated by Conservation Department, allowing for estimated output of 26,000 barrels liquid hydrocarbons other than crude and estimated crude oil underproduction of 11,500 barrels under scheduled allowables aggregating 312,399 barrels daily.

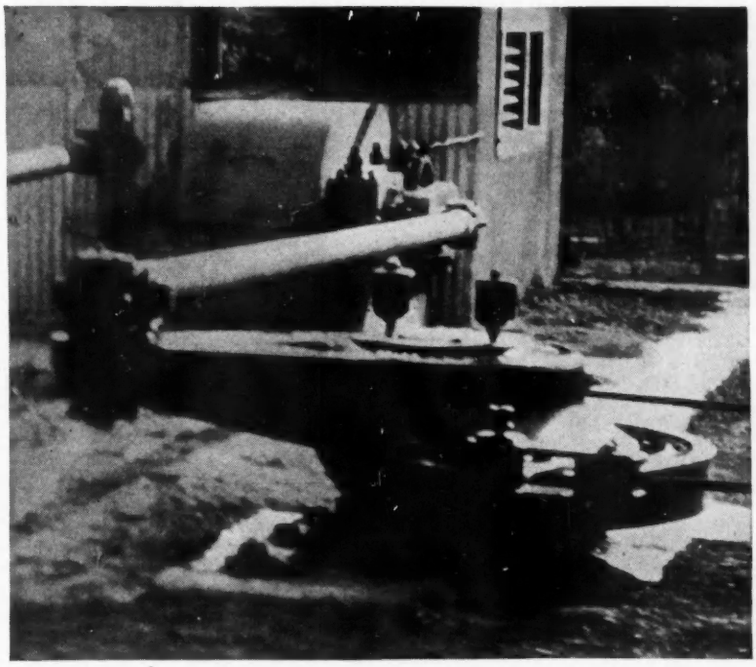
Michigan: These figures are December production aimed at under regulations which do not fix definite state allowable.

New Mexico: Allowable of all petroleum 99,700 barrels, of which it is estimated about 6000 daily will be accounted for by natural gasoline, butane and propane.

Oklahoma: Figures given here are allowables, but state underproduced crude allowable about 13,700 barrels daily in November and similar result may be expected for December.

Texas: Texas Railroad Commission fixed crude allowable at 1,470,658 barrels daily; however, it estimated underproduction of 6.65 percent, or a net allowable of 1,372,859 barrels. This allowable does not include an estimated 114,000 barrels of unprorated distillate and other fluids which are produced daily, and which would bring the total net production to about 1,486,859 barrels daily.

Pumping Nine Wells On SKF's



● *Built by* UNION MACHINE CO.

There are SKF Spherical Roller Bearings on the cranks of this Durnell Universal Pumping Unit which pumps nine East Texas wells. Day after day, these SKF's take heavy loads . . . and take them with the greatest of ease. If shafts deflect, distort or weave, SKF's compensate for them without binding and at the same time retain high capacity. In fact, the only attention they need is infrequent lubrication. As they cut corners on production on this machine, so will they help your machines do more. Remember, a bearing on the job is essential to a machine on the job — anywhere, any time. 5175

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W. S. FARISH IS DEAD

W. S. Farish, president of Standard Oil Company (New Jersey), died of a heart attack Sunday, November 29, at Millbrook, New York, where he was visiting friends. He had spent the day outdoors there and retired early Saturday night apparently in his usual good health. Shortly after 10 p.m. he felt ill and a physician advised him to stay in bed for a day or two. At 2:30 a.m. Sunday morning an acute heart attack developed, and he died immediately.

Few men have been so intimately connected with the development of the oil business. He was a pioneer in developing the first important oil pool in Texas. He was the organizer of what has become one of the leading producing companies in the United States. He was one of the organizers and leaders in the National Petroleum War Service Committee which handled all oil supplies for the United States and its Allies in the first World War. He was an organizer, and later president, of the American Petroleum Institute, and he finished his career as head of one of the country's foremost oil companies.

Comment on Farish's work in connection with the war effort included a statement from Coordinator Harold L. Ickes, who said:

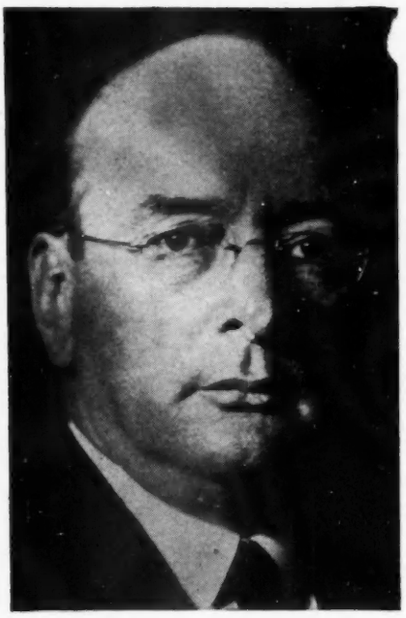
"I feel a very real sense of loss in the death of Mr. William S. Farish. He was a member, from the beginning of our petroleum industry committees and of the Petroleum Industry War Council. As such, he gave the fullest measure of sincere, able and patriotic service to the manifold program which has been necessary to mobilize oil, first for national defense and then for war. He did so even when the taking of these steps called for a disregard of normal competitive consideration. His place in the petroleum war program will not be easily filled."

"The country has lost a real patriot," said William R. Boyd, Jr., president of the American Petroleum Institute and chairman of the Petroleum Industry War Council. "The petroleum industry has lost a stalwart leader at a time when he was most needed.

"He has been an active participant in every movement looking toward the solution of the country's oil problems from the early days when he was a small oil producer in Texas until his untimely death. He has been especially interested in problems relating to the conservation of oil and in the field of scientific research and development.

"He was a member of the Petroleum Industry War Council and chairman of its important committee handling wartime problems related to the organized, nation-wide protection of the oil industry's facilities from enemy action and subversive activities. He was an active leader in the development of every war program sponsored by our War Council. He was always insistent that the interests with which he was associated and which he so ably represented should make full and patriotic contribution to the nation's war effort, regardless of cost or consequence.

"All his life he worked hard and intensely. For months past he has been drawing heavily on his physical strength. He is truly a war casualty."



W. S. FARISH

Farish was born in the village of Mayersville, Mississippi, February 23, 1881. His parents had only limited means and he taught school to earn money to help himself through college. He was graduated from the University of Mississippi with a law degree in 1900 and for only three months he was engaged in the practice of law at Clarksdale, Mississippi.

The event that determined the course of his life was the discovery of oil at Beaumont in 1901. Attracted by the stories of a new El Dorado, Farish closed his law books and at the age of 19 went to find his future in this boom town. There, later on, he organized Brown-Farish Oil Company which for the next 12 years was to lead an up-and-down existence.

It was while engaged in this hazardous enterprise that Farish became acquainted with R. L. Blaffer who died a few weeks ago and with him formed the partnership, Blaffer & Farish. These two men, together with R. S. Sterling and H. C. Wiess and a few other friends, formed Humble Oil & Refining Company in 1917. Sterling was president of this company, Farish vice president, and Blaffer secretary and treasurer.

As a result of his early activities the development of Texas oil resources, Farish was the unanimous choice of the independent producers when they were seeking a president for the Gulf Coast Producers Association in 1915. Later he was president of the Texas-Louisiana Oil and Gas Association. He headed the famous Committee of Eleven, chosen by the oil industry to report to President Coolidge and the Federal Oil Conservation Board on the oil resources of the United States and their probable life. This was the first authoritative study of oil reserves ever undertaken in this country. Farish was greatly interested in the conservation of oil resources and in 1928 fathered the institution of proration in Texas as one of the means toward this end. Since the outbreak of the present war he had spent much of his time in Washington as a member of the Petroleum Industry War Council set up by the industry at the request of the Petroleum Coordinator for War.

The United States declared war on Germany in 1917 shortly after the formation of Humble Oil Company and the late A. C. Bedford, chairman of the board of Standard Oil Company (New Jersey), was asked by the United States Fuel Administrator to organize a group of representative men to assure unified action in supplying the Allies with gasoline and bunker oil. Bedford and W. C. Teagle, who was then president of the Jersey company, immediately suggested Farish as a spokesman for the Texas producers, and he was invited to come to New York as a member of the National Petroleum War Service Committee. Out of that association came the desire on the part of the Jersey management to bring Farish and his newly organized Humble Oil Company into the Jersey family. Humble was fast developing substantial oil production, but was unable to finance itself to keep up with its drilling program. Jersey bought a substantial stock interest in the company and supplied the necessary capital to enable Farish and his associates to carry out their plan for building refineries and pipe lines.

In 1933, Teagle asked Farish to become chairman of the board of the Jersey in New York. This Farish was loathe to do. He was the head of a very successful company and had a host of friends in Houston, where he made his home. Discussing this with friends who tried to dissuade him from the move, he said, "If I consulted my own interests, there is every reason why I should stay here where I want to live. But I am a good soldier. I'm in this business and if my friends in New York think I can be of more use up there I'll go."

In the expectation that he and his family would shortly be able to return to Houston, Farish always kept open his residence in that city, although he assumed such responsibility as to make it necessary for him to spend most of his time away from his home.

In 1937 stockholders at the annual meeting were surprised when president Teagle announced to the shareholders that as of that date he was becoming chairman and that the directors had elected Farish to succeed him as president and chief executive officer. Teagle resigned as chairman a week ago. He was succeeded by R. W. Gallagher, Farish continuing as president and chief executive officer.

Already known throughout the whole oil industry, Farish came into national prominence early this year when a Senate Committee held hearings on Jersey's patent contracts with I. G. Farbenindustrie — entered into in 1929, several years before Farish joined the company. Farish immediately undertook an exhaustive review of this subject as it appeared in several hundred thousand documents in the files of the company. When all of the facts were assembled, he requested audiences before Congressional committees and told the entire story of his company pioneering in the oil-chemical business.

FREE WAR POSTERS

Since the present series of war poster illustrations started to appear in Wickwire Spencer advertising, requests for them have been pouring in from every part of the country. Because of this wide-spread enthusiasm, the popular poster shown above has now been reprinted with the title which won first prize in a 4-state contest among war-workers. It symbolizes to workmen America's war-*production* spirit.

The painting is by the famous artist, Boris Artzybasheff, whose illustrations appear in Life Magazine, and on Time Magazine covers. The posters are of a convenient size; will fit wherever there is a 30-inch space.

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Name.....

Company .....

Address.....

Markets • Statistics • Prices

Refinery Operations Made To Fit War Conditions

Relatively favorable results were shown by the industry in its operations during the week ended November 28, as some heating oil was added to storage in a season when withdrawals are normal; while gasoline, in less demand under widened rationing, was made in reduced volume, with the consequence that production did not very greatly exceed current consumption. Therefore, the week brought a smaller than normal late-November accumulation of gasoline in storage. There occurred also an actual 17,000-barrel addition to stocks of heavy fuel oil, taking into consideration a revision of the previously reported figure for the week before. These results were shown while crude runs to stills averaged 3,736,000 barrels daily, up 14,000 from the previous week, although 409,000 barrels (9.8 percent) under the runs of 4,145,000 barrels in the corresponding week last year, when plants operated around their all-time peak. The 3,736,000 barrels of runs for the November 28 week represented use of 77.8 percent of the nation's indicated 4,800,000 barrels of daily refining capacity.

Crude oil production averaged 3,878,000 barrels daily, down 34,000 from the previous week and 209,000 barrels (5 percent) under the runs of 4,087,000 barrels in the like week last year.

The production of the nation has been running fairly close to refinery requirements of domestic crude, as attested by the fact that crude oil stocks changed only by a 43,000-barrel addition in the week ended November 21, according to Bureau of Mines figures. Crude stocks of 235,305,000 barrels on hand at that time were, however, about 6,500,000 barrels (3 percent) lower now than a year ago, when the total was approximately 242,000,000 barrels.

Refineries of the East Coast and Southwestern districts combined were operated at 67 percent of capacity in processing 1,639,000 barrels daily, down 30,000 barrels from the previous week. Only nominal changes in rates occurred in all other districts except California, which increased daily runs 37,000 barrels to 727,000 daily, representing 89 percent of capacity. In the same week California produced 733,100 barrels of crude oil daily, and therefore took crude from storage, considering crude used as fuel.

Production of gasoline was down 23,000 barrels daily in the week of November 28, probably due in part to sharp curtailment in the East Coast district, where rations have been cut. The Middle West made an increased volume and the Southwest possibly did, too, in anticipation of the pre-rationing rush in those districts. California also made more gasoline. Those areas which increased production of gasoline also added some to storage and accounted for the quarter-million national increment. Present United States stocks of 78,854,000 barrels are 8,000,000 barrels or 9 percent lower than those held at this time last year, which totaled 86,889,000 barrels.

Light fuel oils were taken from storage in the Appalachian, Middle Western, and upper Mid-Continent districts, but gains were shown in California and the East Coast-Southwest regions, to give a net national increase of nearly 200,000 barrels, to a total of 49,739,000 barrels. That quantity on hand November 28 was 5,512,000 barrels (10 percent) less than the 55,251,000 barrels held a year previously.

Residual fuel oil in storage November 28 totaled 77,796,000 barrels, 17,000,000 less than the 94,817,000 barrels on hand a year earlier, a decrease of 18 percent for the year. California accounts for nearly 7,000,000 barrels of this decrease since a year ago, the Middle West 2,000,000, Oklahoma-Kansas 500,000 and the East Coast-Southwestern districts around 7,000,000.

Markets Continue Firm After Gasoline Rush

Markets continue generally tight, as there is undiminished difficulty in supplying both light and heavy oils, although further adjustment to national rationing of gasoline leaves the situation of that product somewhat unsettled.

On the East Coast, supplies of all fuel oils remain scarce, and there has been continued delay in putting the rationing of that product upon a smoothly functioning basis. The gasoline market in the district was quiet, as motorists further adjusted themselves to reduced rations.

Gulf Coast refiners encountered a sharp let-down in demand for gasoline, following

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

ITEM	Crude Oil Prod. Bbls. Day (Add 000)	Crude Oil Prod. Week Ended	Runs to Stills Bbls. Day (Add 000)	Runs to Stills Week Ended	Crude Stocks Bbls. (Add 000)	Crude Stocks Week Ended	Gasoline Stocks Bbls. (Add 000)	Gasoline Stocks Week Ended	Gas Oil & Distillate Stocks Bbls. (Add 000)	Gas Oil & Distillate Stocks Week Ended	Residual Fuel Oil Stocks Bbls. (Add 000)	Residual Fuel Oil Stocks Week Ended
Highs:												
1939	3,910	8- 5	3,650	10-21	278,607	5-26	87,769	4-22	39,562	10-28	116,237	8-26
1940	3,890	3-16	3,690	6-22	265,865	8-31	102,817	4-20	49,051	10-19	109,135	9-14
1941	4,337	11-22	[4]4,120	10-18	266,187	3-29	99,727	3-29	[4]54,983	11-15	102,448	1- 4
1942	[4]4,337	2- 7	3,961	1- 3	263,208	3-28	[1]107,229	3-14	49,861	11-14	95,857	1- 3
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-21	71,152	10- 7	20,722	4-15	105,397	4- 8
1940	3,335	11-30	3,370	1- 6	237,339	1-27	79,847	11- 9	23,551	4- 6	102,344	2-10
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,381	4-12	90,914	7-12
1942	3,297	7- 4	3,393	5-23	235,262	11-14	78,583	11-21	29,240	4-25	76,903	7- 4
Trends in 1942 (Week Ended):												
Jan. 3	4,038	.....	3,961	.....	244,440	.....	92,987	.....	49,357	.....	95,857	.....
Jan. 31	3,871	.....	3,848	.....	250,740	.....	97,810	.....	40,674	.....	91,189	.....
Feb. 28	4,016	.....	3,675	.....	259,373	.....	105,635	.....	34,547	.....	88,285	.....
Mar. 28	3,820	.....	3,667	.....	263,208	.....	105,624	.....	31,756	.....	83,045	.....
April 25	3,581	.....	3,506	.....	257,073	.....	102,897	.....	29,240	.....	81,107	.....
May 30	3,877	.....	3,522	.....	255,023	.....	95,355	.....	31,384	.....	79,628	.....
June 27	3,719	.....	3,581	.....	253,364	.....	88,396	.....	32,851	.....	77,304	.....
July 25	3,691	.....	3,658	.....	249,262	.....	82,281	.....	35,966	.....	77,816	.....
August 29	3,964	.....	3,697	.....	249,007	.....	80,831	.....	42,060	.....	78,034	.....
September 26	3,909	.....	3,802	.....	242,785	.....	80,550	.....	45,945	.....	78,943	.....
October 31	3,901	.....	3,731	.....	239,266	.....	79,159	.....	48,131	.....	79,166	.....
November 7	3,838	.....	3,674	.....	236,198	.....	79,238	.....	49,034	.....	79,125	.....
November 14	3,880	.....	3,788	.....	235,262	.....	79,418	.....	49,861	.....	78,631	.....
November 21	3,912	.....	3,722	.....	235,305	.....	78,583	.....	49,541	.....	[5]77,012	.....
Nov. 28, 1942	3,878	.....	3,736	.....	.....	.....	78,854	.....	49,739	.....	77,796	.....
Nov. 29, 1941	4,087	.....	4,145	.....	[4]241,956	.....	86,889	.....	55,251	.....	94,817	.....
Change:												
In week	—34	.....	+14	.....	+43	.....	+271	.....	+198	.....	+784	.....
In year	—209	.....	—409	.....	—6,651	.....	—8,035	.....	—5,512	.....	—17,021	.....
In year	—5.1%	.....	—9.8%	.....	—2.7%	.....	—9.2%	.....	—9.9%	.....	—17.9	.....

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, November 22, 1941. [5] Reflects 767,000 barrel downward revision in East Coast—Southwest regions.

Crude Oil Production in the United States

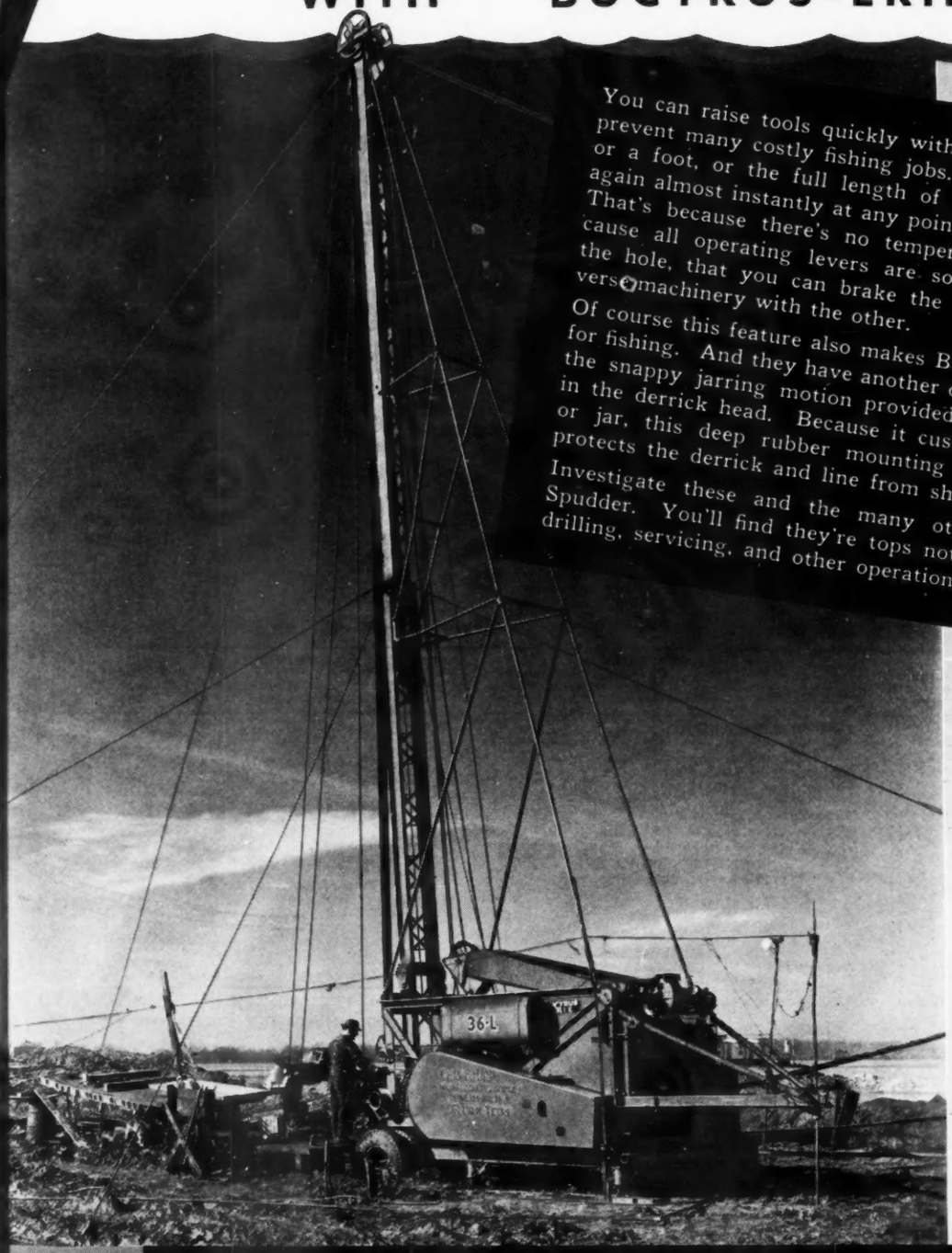
(Estimates compiled by The Oil Weekly. All figures indicate daily averages, in barrels)

STATE OR DISTRICT	*State Allowable of Crude Production	PRODUCTION IN WEEK ENDED Nov. 28	PRODUCTION IN WEEK ENDED Dec. 5
Arkansas	74,885	74,000	73,700
California	771,100	736,300	725,600
Long Beach	.....	34,600	34,600
Midway-Sunset	.....	55,900	57,100
Kettleman Hills	.....	37,500	37,800
Wilmington	.....	93,900	95,600
Rest of State	.....	514,400	500,500
Colorado	.....	6,500	6,650
Illinois	.....	254,250	247,100
Salem	.....	36,100	35,800
Louden	.....	43,100	42,950
Other New Pools	.....	156,850	156,600
Old Pools	.....	18,200	11,750
Indiana	.....	16,700	16,300
Kansas	295,500	299,100	285,950
Kentucky	.....	12,300	12,050
Louisiana	300,100	325,100	319,950
North Louisiana	.....	96,600	96,450
South Louisiana	.....	228,500	223,500
Michigan	63,675	60,950	58,550
Mississippi	.....	61,300	62,150
Missouri	.....	130	130
Montana	.....	21,650	24,250
Nebraska	.....	3,200	3,150
New Mexico	93,700	96,500	96,500
New York	.....	12,800	12,600
Ohio	.....	9,650	9,500
Oklahoma	373,900	365,700	366,150
Oklahoma City	.....	66,500	69,300
Seminole Area	.....	84,450	84,100
Rest of State	.....	214,750	212,750
Pennsylvania	.....	49,650	47,150
Tennessee	.....	30	30
Texas	1,372,859	1,381,000	1,382,000
Upper Gulf Coast	.....	312,800	313,200
East Texas Field	.....	355,200	358,700
Rest of Eastern Texas	.....	96,100	100,100
Lower Gulf Coast	.....	105,500	102,800
Southwest Texas	.....	53,400	53,300
South Central Texas	.....	18,200	17,400
West Texas	.....	211,900	209,600
North Texas	.....	137,800	135,200
Panhandle	.....	90,100	91,700
Utah	.....	15	15
West Virginia	.....	9,800	9,000
Wyoming	.....	93,650	94,400
Total 8 Prorated States	3,345,719	3,338,650	3,308,400
Total United States	.....	3,890,275	3,852,875

* Details on state allowables in this issue of The Oil Weekly.

Fishing is Easy

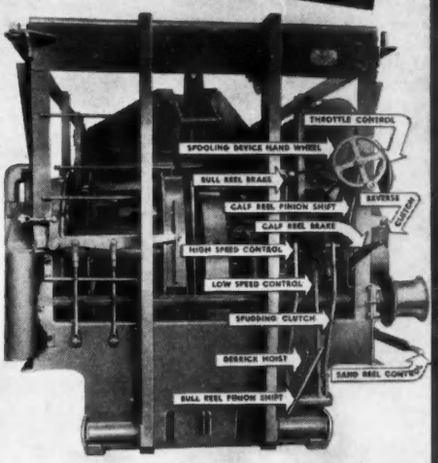
WITH BUCYRUS-ERIE SPUDDERS



You can raise tools quickly with a Bucyrus-Erie Spudder and thus prevent many costly fishing jobs. You can raise tools just an inch, or a foot, or the full length of the hole, and then start lowering again almost instantly at any point — all without the aid of a helper. That's because there's no temper screw to bother with; and because all operating levers are so conveniently arranged, close to the hole, that you can brake the bull reel with one hand and reverse machinery with the other.

Of course this feature also makes Bucyrus-Eries unusually adaptable for fishing. And they have another outstanding fishing feature too — the snappy jarring motion provided by the rubber shock absorber in the derrick head. Because it cushions the force of a heavy pull or jar, this deep rubber mounting under the crown sheave also protects the derrick and line from shock loads.

Investigate these and the many other features of Bucyrus-Erie Spudder. You'll find they're tops not only for fishing but also for drilling, servicing, and other operations.



You'll find that the convenient arrangement of controls on a Bucyrus-Erie saves plenty of time . . . and grief. They're all grouped together, close to the hole, where you can grab them quick when trouble starts.

BUCYRUS-ERIE CO.

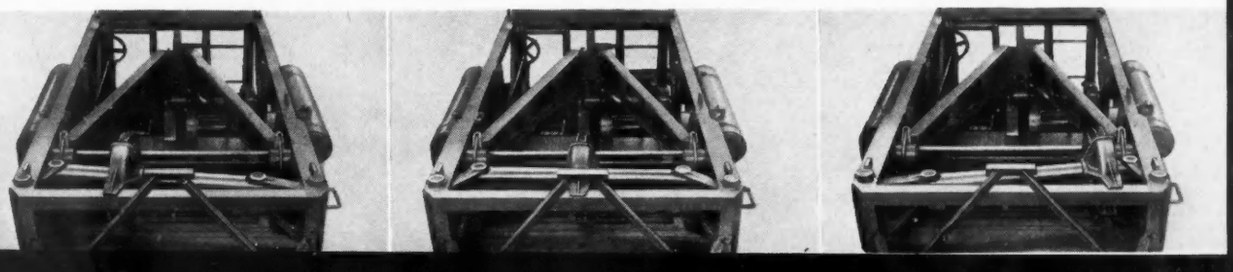
SOUTH MILWAUKEE • • WISCONSIN

★

SALES OFFICES AND DISTRIBUTORS IN ALL PRINCIPAL OIL TERRITORIES

ULLY AUTOMATIC SPOOLING DEVICE ON THE 36-L

ave time and go easy
r drill-line with a
-Erie 36-L. Control
ing on the bull reel is
utomatic. The heel
travels back and forth
shaft without manipu-
r hazard to the oper-
This is an exclusive
and is just one of the
advantages that make
one of the fastest,
drilling-servicing-fish-
chines on the market.



the pre-rationing flood of local business, as did those of other districts of the Southwest and the Middle West. The Gulf Coast plants had plenty of gasoline to take care of the abnormally large temporary demand, but the period put a severe strain on many refiners of the Mid-Continent and the Middle West, some of whom were completely sold out before the December 1 deadline on filling up tanks in advance of curtailment of sales.

Refiners of the Middle West reported sold-out situations on gasoline and scarcities of other products, while there was continued confusion over the coupon system in rationing fuel oils.

Western Pennsylvania refiners remained short on gasoline, fuel oils, and kerosine, but there was some further weakening of the market for neutral oils, with additional plant owners lowering their quotations.

Landreth Sells Interest to Stanolind Oil & Gas

Landreth Company, successor to Landreth Production Corporation, which sold the bulk of its holdings in West Texas and New Mexico last December to Stanolind Oil & Gas Company for $4,150,000, has disposed of its remaining interests to same buyer for $120,000, plus 50 percent of the net profits. Stockholders of Landreth Company have been assigned specific portions of the pending oil and gas payments; also royalty interests, and the company will be liquidated. In the concluding deal, Stanolind acquires full interest in two oil wells and a gasser in Goldsmith field, considerable wildcat acreage, and certain deep rights previously reserved. Stanolind's original purchase involved a half-interest and operating control of developed properties, and remaining interests were assigned direct to stockholders of Landreth Production Corporation.

Shell Buys Stock of Fain-McGaha Oil Corporation

Shell Oil Company has contracted for purchase of the capital stock of Fain-McGaha Oil Corporation, Wichita Falls firm that has extensive holdings in North, West Central and East Texas, for $4,000,000. The transaction requires stockholders of Fain-McGaha Oil Corporation to establish a new firm, or trustee to repurchase shallow oil properties in Jones, Shackelford and Taylor counties, gas wells in Texas Panhandle, along with drilling equipment and other physical assets for an approximate consideration of $500,000. Shell purchased the stock of Petroleum Producers Company and United Producers Company, both Wichita Falls firms, last December for an aggregate of $2,750,000 cash.

Fain-McGaha Oil Corporation is producing 2000 barrels of oil daily in North Texas, with the bulk of this coming from 15 Ellenburger and 42 Strawn wells in the K-M-A field. The company also holds half interest in four leases with 52 wells in the thick-sand section of the East Texas field.

Jersey Company Buys Properties in Montana

All assets of Santa Rita Oil & Gas Company, a Montana corporation, of Cut Bank, Montana, including its two wholly-owner subsidiaries, Northwest Refining Company and Santa Rita Purchasing & Storage Company, will be acquired by Standard Oil Company (New Jersey), under terms of a preliminary agreement reached November 17 by officials of the two companies.

Announcement of the transaction, a stock transfer, was made jointly by Louis B. O'Neil, president of the Santa Rita companies, and L. F. McCollum, acting for the Jersey company. McCollum is president of The Carter Oil Company, a fully-owned Jersey subsidiary.

Assets of the Santa Rita companies are to be consolidated in Northwest Refining Company and it is proposed that the stock of the latter company be exchanged for Standard Oil Company (N. J.) stock on the basis of 12 shares of Santa Rita for 1 share of Jersey.

Those associated with O'Neil in guiding the Santa Rita enterprise through a rapid ten-year growth, including C. N. McCabe, vice president of Santa Rita and Northwest; Reese Poynter, vice president of Santa Rita; T. J. Landry, vice president of Northwest; and V. R. Nelles, secretary-treasurer of Santa Rita and Northwest, will continue for the present to operate the properties for Jersey.

Wholesale Prices of Refined Products in Principal Markets

REFINED GASOLINE	Current Range (Cents a gal.)		Changes from Month Ago	
Oklahoma Refineries:				
60 Octane and Under	5⅛	5¼	...	...
63-66 Octane	5½	5⅝	...	...
72-74 Octane	5⅞	6	...	...
78 Octane, Ethyl	6¾	6⅞	...	...
Mid-Western Tank Car:				
60 Octane and Under	5⅛	5¼	...	...
63-66 Octane	5½	5⅝	...	...
72-74 Octane	5⅞	6	...	...
78 Octane, Ethyl	6¾	7⅛	...	...
New York Harbor:				
68-70 Octane	9¼	9¼	...	...
72-74 Octane	9¼	10¼	...	...
Min. 80 Octane, '39 Research	9⅞	9⅞	...	...
Gulf Coast:				
60 Octane unleaded	5	5	...	...
65 Octane unleaded	5⅛	5⅜	...	...
68 Octane unleaded	5¼	5¼	...	...
70 Octane unleaded	5¼	5⅜	...	...
72-74 Octane leaded	5⅜	5⅜	+¼	—¼
Min. 80 Octane, '39 Research	5½	6	...	+½
NATURAL GASOLINE				
Grade 26-70:				
F.O.B. Group 3	3⅞	3⅞	+½	+½
F.O.B. Br'kenr'ge, Tex.	3½	3½	+¼	+¼
KEROSINE				
Oklahoma Refineries:				
41-43 water white	4⅜	4½	...	...
42-44 water white	4½	4⅝	...	...
Mid-Western Tank Car:				
41-43 water white	4⅜	4⅝	...	...
42-44 water white	4½	4½	...	...
New York Harbor	6⅞	6⅞	...	...
Gulf Coast:				
41-43 water white	3⅞	4¼	...	...
RANGE OIL				
At Oklahoma Refineries	4	4⅛	...	...
In Mid-Western Market Group 3, basis	4	4⅛	...	...
LIGHT FUEL OILS				
Oklahoma Refineries:				
No. 1 prime white	3⅞	3⅞	...	...
No. 1 straw	3⅞	4	...	...
No. 2 straw	3⅝	3⅞	...	...
No. 3	3½	3½	...	...
Mid-Western Tank Car:				
No. 1 prime white	3⅞	4⅛	...	...
No. 2 straw	3⅝	3⅝	...	...
No. 3	3½	3½	...	...
New York Harbor:				
No. 1	6⅞	6⅞	...	...
No. 2	6¾	6¾	...	...
No. 3	6¾	6¾	...	...
Gulf Coast:				
No. 2	3¾	3¾	...	...

HEAVY FUELS	Current Range (Per Bbl.)		Changes from Month Ago	
Oklahoma Refineries:				
No. 6	$0.80	$0.90	...	...
14-16 Gravity	.95	.95	...	...
Mid-Western Tank Car:				
No. 5	.85	.85	...	...
No. 6	.80	.80	...	—.05
New York Harbor:				
No. 5	1.95	2.10	...	...
No. 6	1.65	1.65	...	...
BUNKER C FUEL OIL (Per barrel, ships' bunkers)				
Gulf Coast	$0.85	$0.85	...	—.05
New York Harbor	1.65	1.65	...	...
DIESEL OIL (Per barrel, ships' bunkers)				
Gulf Coast	$1.65	$1.68	+.10	...
New York Harbor	2.78	2.78	...	...
LUBRICATING OIL (Cents a gallon)				
Oklahoma Refineries:				
Bright stock (viscosity at 210°):				
200 vis. D, 10-25 pour point	27	27	...	...
150-160 vis. D:				
0-10 pour point	23	23	...	...
10-25 pour point	22½	23	...	...
25-40 pour point	23	23	...	...
150-160 vis. E	22	22	...	...
120 vis. D, 0-10 pour point	22	22	...	...
600 s.r. dark green	8½	8½	...	...
600 s.r. olive green	10	11	...	...
631 s.r.	18½	18½	...	...
Neutral Oils (viscosity at 100°, 0-10 pour point):				
Pale Oils:				
60- 85 vis. No. 2 color	8	8	...	...
86-110 vis. No. 2 color	8½	8½	...	...
150 vis. No. 3 color	14½	14½	...	...
180 vis. No. 3 color	15	15	...	...
200 vis. No. 3 color	15	15	...	...
250 vis. No. 3 color	16	16½	...	...
280 vis. No. 3 color	17	17	...	...
300 vis. No. 3 color	18	18	...	...
Red Oils:				
180 vis. No. 5 color	15	15	...	...
200 vis. No. 5 color	15	15	...	...
280 vis. No. 5 color			...	...
300 vis. No. 5 color	17½	17½	...	...
Western Pennsylvania: Cylinder Stocks:				
600 s.r. filtrable	15	15	...	...
650 s.r.	15½	15½	...	...
600 flash	16	16	...	...
630 flash	17	17	...	...

LUBRICATING OIL (Cents a gal.)			Changes from Month Ago	
Bright Stock (No. 8 Color, 145-155 vis. at 210°, 540-550 fl.):				
10 pour test	30½	30½	...	...
15 pour test	29½	29½	...	...
25 pour test	25	25	...	...
Viscous Neutrals (No. 3 Color, vis. at 70°):				
200 (180 at 100), 420-425 fl.:				
Zero pour test	31½	31½	—1½	—1½
10 pour test	30½	30½	—1½	—1½
15 pour test	29½	29½	—1½	—1½
25 pour test	24	26	—2	...
150 (143 at 100), 400-405 fl.:				
Zero pour test	31½	31½	—1½	—1½
10 pour test	28½	28½	—1½	—1½
15 pour test	27½	27½	—1½	—1½
25 pour test	22	24	—2	...

CRUDE OIL PRICES UNCHANGED

Schedule of crude oil prices was unchanged during November, remaining as reported in THE OIL WEEKLY of July 6, 1942, pages 47-48.

MAJOR CRUDE OIL PRICE CHANGES

	Penna. Grade	Mid-Cont. (36 Gr.)	Calif. (26 Gr.)
Jan. 1, 1940	Up 25	.....	.....
Feb. 1, 1940	.....	.....	Cut *7
May 22, 1940	Cut 25	.....	.....
June 18, 1940	Cut 25	.....	.....
July 12, 1940	Cut 25	.....	.....
Aug. 28, 1940	Cut 15	.....	.....
Nov. 12, 1940	Up 15	.....	.....
Dec. 17, 1940	Up 15	.....	.....
Jan. 27, 1941	Up 15	.....	.....
April 1, 1941	.....	Up 5	.....
April 23, 1941	Up 10	.....	.....
April 24, 1941	.....	.....	Up *6
May 19, 1941	.....	Up 10	.....
May 21, 1941	Up 15	.....	.....
May 22, 1941	.....	.....	Up *6
June 18, 1941	Up 20	.....	.....
Aug. 14, 1941	Up 23	.....	.....
Aug. 25, 1941	Cut 23	.....	.....
March 26, 1942	Up 25	.....	.....

* Signal Hill 26 gravity.

U. S. Field Operations

Illinois Basin

New Pool Opener Showing in White County

White County wildcat shows for pool opener. Northeast outpost to Bluford pool, Jefferson County, sets casing. Clinton County Trenton test abandoned.

White County: B. M. Heath's Ralston Trust 1, SW NE SW 24-5s-8e, 5 miles west of Carmi and 3½ miles from production, showed 20 ft of free oil, 10 ft of oil-cut mud and 180 ft of salt water in an hour's drill-stem test of Cypress sand at 2849-61 ft. Barring more promising pays at lower levels, casing probably will be set to the Cypress.

Jefferson County: Lario Oil & Gas Co.'s Mountain-Mateer 1, N½ NW SE 36-3s-4e, northeast outpost in the Bluford area, has set casing on McClosky limestone at 3012-16 ft.

Clinton County: Olson Oil Co.'s Alberternst 1, SW NE NW 29-2n-4w, a wildcat near Breeze which was closely watched, has been abandoned in Trenton lime at 3250 ft.

A Devonian test, Gulf Refining Co's Martin 1, SW SE SE 33-3n-1w, 3 miles east of the Boulder pool, was drilling below 2300 ft.

Marion County: Two wildcat operations have been started. Two miles southwest of the Patoka pool A. J. Hammer's Cephas-Adams 1, NW NW NE 8-3n-1e, was drilling below 1350 ft, and a mile southeast of the same field W. P. Muller's Doris Sloan 1, SE SE SE 2-3n-1e, was drilling below 500 ft.

Madison County: Two wildcats have been spudded. C. A. Smith's E. Michael 1, SE SE NE 11-3n-6w, 2 miles northeast of the St. Jacob pool, was drilling below surface pipe and R. A. Lane and C. E. Stout's E. Engel 1, NE NW NW 7-6n-7w, was shut down for repairs at 1140 ft.

Indiana

Posey County: Roy Lee, Trustee's Dearing 1, NE NE NE 30-8s-14w, wildcat two miles south of production, was shut down for orders at 2625 ft, with no commercial shows reported.

In the Mt. Vernon pool, Carter Oil Co. located Mertens 1, SW SW SW 17-6s-12w, northeast of the Caborn pool and 8 miles west of Evansville.

Gibson County: McGinnis et al Carithers 1, NW NE SW 26-1s-10w, 4 miles northeast of Princeton, was testing Hardinsburg sand show at 1323-33 ft, after 60-quart shot. Natural well made 80 barrels of oil in 12 hours.

Kentucky

Hopkins County: Continental Oil Co.'s Baker 1, NE SE 12-J-22, wildcat 10 miles southeast of Providence, was drilling at 1213 ft with rotary.

Crittenden County: H. C. Detrich's Orr 1, SE NW NW 24-K-19, wildcat 6 miles east of Marion, baled 4 gallons oil an hour from McClosky at 1054-76 ft. Expect to acidize.

Henderson County: Cherry and Kidd's Burbank 7, 24-Q-21, swabbed 40 bbls an hour from Cypress sand at 2284-97 ft, apparently the best producer in the new Smith Mills pool.

Results on Industry's Prospecting Fronts

Completion of 49 wildcat tests last week added 5 new oil fields to bring to 402 the total of such strikes through drilling of 2901 wildcat tests during the year.

East Texas: Paluxy strike in Wood County probably important.

North Louisiana: Bossier Parish wildcat marking probable field.

Wyoming: New zone at Elk Basin is a good one.

California: Important extensions in two sectors.

ILLINOIS FIELD COMPLETIONS

Clay County: W. C. McBride's Armstrong 1, c se sw nw 10-3n-7e, Cyp 2590-2609 ft, 42 bbls, 2609 ft.

Walter Duncan's Behrens 1, nw nw ne 9-5n-7e, L. Weller 2545-49 ft, 204 bbls, 2551 ft.

Kingwood's Lewis 1, nw nw sw 9-5n-7e, L. Weller 2534-38 ft, 155 bbls, 2538 ft.

Clinton County: E. Frank Jones' Harrison 4, nw se nw 2-2n-2w, Benoist 1221-30 ft, 130 bbls, 1230 ft.

Effingham County: Kingwood's See Estate 1, c nw sw se 27-6n-5e, Ben 2292-2300 ft, AV 2357-75 ft, 36 bbls 8 hrs, 2387 ft.

Kingwood's See 2, c sw sw se 27-6n-5e, Ben sd 2289-2318 ft, AV 2358-71 ft, 68 bbls, 2376 ft.

Tide Water's Burk 5, c ne se sw 27-6n-5e, Ben 2290-2320 ft, AV 2357-73 ft, 105 bbls, 2374 ft.

Fayette County: Carter's Drees 9-D, c se nw 22-8n-3e, Dev 3033-36 ft, 108 bbls, 3036 ft.

Franklin County: H. H. Wegener's C. W. & F. Coal Co. 4, nw sw se 26-6s-2e, Tar Spgs 2150-68 ft, 142 bbls, 2168 ft.

Gallatin County: Cherry & Kidd's Kerwin 6, se se sw 11-8s-10e, Walts 1940-62 and 2032-50 ft, 100 bbls, 2054 ft.

Hamilton County: Magnolia's Travis 2, c ne se se 20-4s-7e, abnd 3527 ft.

Texas Co.'s Ledbetter 1, c e½ ne nw 21-4s-7e, abnd 3480 ft.

Magnolia's Hamilton 3, c e½ ne sw 24-6s-5e, AV 3107-23 ft, 325 bbls, 3308 ft.

Shell's Hungate 2, c sw nw sw 24-6s-5e, AV sd 3093-3127 ft, 475 bbls, 3131 ft.

Texas Co.'s Hall A-4, c nl n½ nw 18-6s-6e, AV sd 3103-23 ft, 911 bbls, 3125 ft.

Texas Co.'s Bond 3, c w½ sw ne 34-6s-6e, AV sd 3093-3108 ft, 174 bbls, 3108 ft.

Magnolia's Irvin 1, c nw sw se 35-6s-6e, abnd 3163 ft.

Shell's Morris 4, c se nw se 18-6s-7e, AV 3027-36 ft, 18 bbls, 3059 ft.

Shell's Summers 4, c se ne ne 18-6s-7e, AV 3010-56 ft, 211 bbls, 3075 ft.

Texas Co.'s Gott 1, nw se nw 18-6s-6e, AV 3187-3200 ft, 55 bbls, 3209 ft.

Texas Co.'s Hall B-7, c se ne se 18-6s-7e, AV 3024-28 and 3032-42 ft, 100 bbls, 3048 ft.

Pure's Pyle B-1, c nw sw sw 17-6s-9e, Ben 2787-2792 ft, 45 bbls, 2800 ft.

Jasper County: Gulf's Snider 1, se sw se 23-5n-10e, L. O'Hara 2940-46 ft, 518 bbls, 2951 ft.

Gulf's Maxwell 2, c nw sw 20-6n-10e, McC 2818-48 ft, 436 bbls, 2848 ft.

Jefferson County: Magnolia's Roach 1, c nw nw ne 27-2s-1e, abnd 2326 ft.

Lawrence County: E. O. Olds' Van Wey 5, ne se se 23-2n-12w, abnd 1910 ft.

Smith & Nye's Spidel 4-B, se nw se 23-2n-12w, Biehl 1367-81 ft, 250 bbls, 1381 ft.

Smith & Nye's O. Van Wey 2, c ne nw ne 26-2n-12w, Biehl 1310-23 ft, 145 bbls, 1327 ft.

Madison County: E. A. Oberling et al's Schoeck 1, c sw se se 27-3n-6w, Trenton 2315-41 ft, 85 bbls, 2319 ft.

Richland County: W. W. Shaffer et al's Boley 2, c s½ ne nw 33-4n-9e, abnd 2648 ft.

Wabash County: Joe Bander et al's Seibert 1, c nw sw 9-1n-13w, abnd 2540 ft.

Skiles et al's Smalley 2, se se ne 3-1s-13w, Cyp sd 2313-25 ft, 176 bbls, 2325 ft.

L. E. Kennedy's Carson 6, c s½ nw se 16-1s-12w, Rosi 2282-88 ft, McC 2304-12 ft, 224 bbls, 2312 ft.

Wayne County: Pure's Fishel A-1, c w½ sw nw 35-1n-8e, AV sd 2980-3008 ft, 44 bbls, 3215 ft.

W. C. McBride's Byars 1, c se ne sw 19-1s-5e, abnd 3068 ft.

Mid-Continent's Spitzner 1, c ne nw 4-1s-6e, abnd 3224 ft.

Texas Co.'s Harlan 3, c w½ nw se 22-1s-6e, McC 3202-09 ft, 22 bbls, 3209 ft.

Kewanee O&G's Beck 1, c sw nw 29-1s-7e, McC 3255-61 and 3270-72 ft, 236 bbls, 3280 ft.

White County: Herndon Drlg.'s Bond 1, c nw ne 8-4s-14w, AV 2807-37 ft, gas input, 2837 ft.

Ivan White's Lomas 3, ne nw sw 14-4s-14w, Tar Spgs 2223-40 ft, 125 bbls, 2241 ft.

Cal Star Pet. Co.'s Miller-Ford 16-B, ne se

U. S. Drilling Operations in Week Ended December 5, 1942

STATE	ALL WELLS COMPLETED — THIS WEEK Total	Oil	Gas	Dry	*Miscel.	Total 1942	Total this Date 1941	‡WILDCATS COMPLETED — THIS WEEK Total	Oil	Gas	Dry	Distillate	Total 1942
Alabama	.....	.....	.....	.....	.....	3	5	.....	.....	.....	.....	.....	3
Arizona	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	2
Arkansas	.....	.....	.....	.....	.....	123	182	.....	.....	.....	.....	.....	19
California	20	18	.....	2	.....	733	1,075	3	1	.....	2	.....	110
Colorado	1	.....	.....	1	.....	15	18	1	.....	.....	1	.....	3
Florida	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	1
Georgia	.....	.....	.....	.....	.....	2	1	.....	.....	.....	.....	.....	2
Illinois	53	38	.....	14	1	2,034	3,719	8	2	.....	6	.....	559
Indiana	8	1	2	4	1	359	508	2	.....	.....	2	.....	91
Iowa	.....	.....	.....	.....	.....	.....	6	.....	.....	.....	.....	.....	.....
Kansas	32	12	.....	17	3	1,522	2,111	9	.....	.....	9	.....	342
Kentucky	.....	.....	.....	.....	.....	155	318	.....	.....	.....	.....	.....	37
Louisiana	10	9	.....	1	.....	871	1,472	.....	.....	.....	.....	.....	134
Michigan	.....	.....	.....	.....	.....	632	805	.....	.....	.....	.....	.....	169
Mississippi	3	.....	.....	3	.....	100	192	3	.....	.....	3	.....	42
Missouri	.....	.....	.....	.....	.....	34	78	.....	.....	.....	.....	.....	21
Montana	7	6	1	.....	.....	193	209	1	.....	1	.....	.....	8
Nebraska	.....	.....	.....	.....	.....	28	88	.....	.....	.....	.....	.....	14
New Mexico	6	5	.....	.....	1	362	367	.....	.....	.....	.....	.....	42
New York	28	19	.....	1	8	1,165	1,017	.....	.....	.....	.....	.....	1
Ohio	25	4	9	12	.....	1,061	1,682	.....	.....	.....	.....	.....	.....
Oklahoma	38	14	4	12	8	1,330	2,030	3	.....	1	2	.....	275
Pennsylvania	47	41	4	2	.....	3,623	3,783	.....	.....	.....	.....	.....	.....
Tennessee	.....	.....	.....	.....	.....	8	22	.....	.....	.....	.....	.....	5
Texas	61	30	6	25	.....	4,961	9,813	18	1	2	15	.....	1,010
Utah	.....	.....	.....	.....	.....	.....	3	.....	.....	.....	.....	.....	.....
Virginia	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
West Virginia	18	5	10	2	1	713	712	.....	.....	.....	.....	.....	.....
Wyoming	3	2	1	.....	.....	98	123	1	1	.....	.....	.....	11
Total this week	360	204	37	96	23	20,129	30,340	49	5	4	40	.....	2,901
Total last week	349	194	39	96	20	19,769	29,761	50	8	1	41	.....	2,852
Total this year	20,129	10,433	1,750	5,308	2,638	.....	.....	2,901	402	54	2,437	8	.....

* Includes old wells deepened, water intake, gas input, salt water disposal, and distillate wells.
‡ OPC program calls for 4,000 wildcats in 1942, of which 624 should produce oil and 116 gas, leaving 3,260 dry.

nw 21-4s-14w, Ben 2696-2713 ft, 425 bbls, 2854 ft.

Jarvis Bros. & Marcell 5, nw se sw 31-4s-11e, Tar Spgs 2327-51 ft, 400 bbls, 2351 ft.

Jarvis Bros. and Marcell's E. Spencer 6, c se nw sw 31-4s-11e, Tar Spgs 2323-40 ft, 140 bbls, 2340 ft.

Sun's Hossier-Spencer Unit 3, nw ne nw 6-5s-11e, Clore 2028-36 ft, Tar Spgs 2324-53 ft, 330 bbls, 2353 ft.

Gulf's Moore 4, ne sw nw 12-7s-8e, Walts 2189-96 ft, 32 bbls, 2207 ft.

ILLINOIS WILDCAT COMPLETIONS

Jackson County—Failure: F. R. Wiley et al's 1st Natl Bank of Murphysboro 1, sw se sw 7-9s-3w, abnd 775 ft.

Jasper County—New Field: C. L. Farsworth's Barnes 1, nw ne sw 7-5n-11w, Robinson 953-83 ft, 10 bbls, 983 ft.

Macoupin County—Failure: A. M. Scroggin's Bates 1, ne sw sw 18-10n-7w, abnd 570 ft.

Perry County—Failure: C. H. Harrison's Bureggman 1, ne ne ne 11-5s-4w, abnd 1577 ft.

Randolph County — Failure: Fred Erb's Young 1, se ne se 2-4s-5w, abnd 685 ft.

Wabash County — New Field: Magnolia's Sturman 1, ne ne ne 10-1s-13w, Cyp 2315-28 ft, 85 bbls, 2686 ft.

Wayne County — Failure: Carl Robinson's Riggs 1, c s½ se se 33-1s-9e, abnd 3408 ft.

Wayne County—New Field: H. H. Weinert's Thompson Comm. 1, c n½ sw se 32-2s-6e, McC 3373-78 ft, 40 bbls, 3379 ft.

ILLINOIS WILDCAT STARTS

Champaign County: R. F. G. Drlg. Co.'s Reynolds 3, nw sw ne 1-22n-7e, dr.

Clinton County: Olson Oil Co.'s Alberternst 1, sw ne nw 29-2n-4w, dr.

Gallatin County: Kingwood Oil Co.'s Dodge 1, ne nw sw 32-8s-10e, lcn.

Lawrence County: E. S. Holmann's R. Kelly 1, nw se ne 36-4n-12w, lcn.

Madison County: E. C. Stout et al's Goebel et al 1, c e½ ne ne 7-6n-7w, lcn.

Marion County: A. J. Hammer et al's Adams 1, nw nw ne 8-3n-1e, lcn.

Richland County: Pure's Berger Cons. 1, se se sw 26-4n-9e, lcn.

St. Clair County: H. C. Robinson et al's Karvon 1, sw ne sw 17-2s-8w, lcn.

White County: Sheridan & Heath's Ralston Trustee 1, sw ne sw 24-5s-8e, lcn.

OLD WELLS DEEPENED

Randolph County: General Oil & Gas Co.'s Schmall 1, c s½ 27-4s-7w, dr.

St. Clair County: Pritchard & Livermore's Halliday 1, se ne nw 31-2n-7w, dr.

INDIANA FIELD COMPLETIONS

Gibson County: R. D. Brown, Inc.'s Lehman 3, se se nw 36-1s-10w, Hardins 1346-66 ft, 1608 gas, 1385 ft.

R. D. Brown's Lehman 4, nw se nw 36-1s-10w, Hardins 1406-18 ft, 2700 gas, 1419 ft.

Jay County: Grisell & Kwis' Clarence Hiatt 1, nw nw se 16-23n-13e, abnd 1300 ft.

Posey County: Carter and Gulf's Erwin C-76 2, c sw nw ne 1-7s-14w, Mans 1260-78 ft, Walts 1994-2007 ft, 100 bbls, 2007 ft.

Spencer County: Damron, Gray & Savage's E. L. Hall 1, nw nw sw 34-7s-7w, abnd 1706 ft.

OLD WELL DEEPENED

Daviess County: R. D. Brown, Inc.'s Earl McCracken 2, c n½ nw ne 21-2n-6w, otd 738 ft, abnd 798 ft.

INDIANA WILDCAT COMPLETIONS

Posey County—Failure: Walter A. Martin et al's Elva Stallings 1, nw nw se 25-5s-14w, abnd 2609 ft.

Spencer County—Failure: Spencer Dev. Co.'s G. B. Abshire 1, ne ne nw 14-7s-7w, abnd 1618 ft.

INDIANA WILDCAT STARTS

Gibson County: Continental's Young 1, se se nw 12-3s-13w, lcn.

Posey County: Superior's Carr 1, nw nw sw 29-4s-13w, lcn.

Oklahoma

Gilcrease Productive In Okemah and Hughes

Gilcrease pays off at North Okemah and northeast Hughes. Second well shows in new Carter pool.

Okfuskee County: British American Oil Co.'s Bloss 2-A, SW SE SW 36-12-9e, in the new North Okemah field, looks like a good pool well at 3144-3148 ft in Gilcrease sand. On 24-hour test the well made 290 bbls through casing.

Hughes County: O. H. Grimes' Bailey Consolidated 1, SE NW SW 19-8-11e, is a 13,800,000 gas well on open flow test from Gilcrease sand at 2870-2893 ft. Gas is wet, and on early test showed a spray of oil.

Lincoln County: Mid-Continent's test in NW NE 32-17-5e, is testing Skinner sand through perforations at 3431-3452 ft. Well is making 8 to 12 million gas, with some mud and water believed to be coming from up the hole. Operator will re-cement for more accurate testing.

Carter County: Lloyd Noble's Tomlinson 1, NE SW SW 13-5s-1e, made 2500 ft of oil into stem on 30-min test from Skinner sand at 3942-4060 ft. Well is second for pool; is north offset to discovery, but has the pay considerably lower than the 3220-3232-ft markers in discovery. However, saturation at this depth may indicate extensive closure to increase anticipated field reserve.

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OKLAHOMA FIELD COMPLETIONS

Carter County — West Hewitt: Batson & Sanders' Williams 3-A, ne nw se 20-4s-2w, sand 2535-53 ft, pay 2532-53 ft, lime 2908 ft, pay 2885-3031 ft, pump 120 bbls, 3079 ft.

Creek County — Semi-Wildcat: Hubbell & Webb's Gibson 1, ne nw nw 31-14n-7e, Prue 2856 ft, 2879 ft.

Creek County—Bristow: Tibbins' McMillan 1, c nw sw 1-15n-9e, Bartlesville 2360 ft, abnd 2939 ft.

J. O. Williams' Blackmore 1, sw nw sw 17-16n-10e, Bartlesville 2360 ft, abnd 2480 ft.

Indo Oil Co. et al's Sessions 1, nw nw sw 5-16n-12e, Wx 2524 ft, abnd 2538 ft.

Creek County—N. Bristow: J. E. Britton's Wright 2, c s½ sw se 17-17n-8e, Prue 2334 ft, shot 40 qts 2336-48 ft, pump 30 bbls, 2348 ft.

Lincoln County—North Agra: Danciger O & G's Scott 2, c se nw 31-17n-4e, abnd.

Logan County—Guthrie: Continental's Metze 2, ne sw ne 12-17n-2w, Bartlesville 5187 ft, pb 5205 ft, abnd 5222 ft.

Sunray Oil Co.'s McLoud 3-A, ne nw se 12-17n-2w, Bartlesville 5192 ft, shot 15 qts, pump 65 bbls, 5204 ft.

Logan County—Lovell: Bahan Bros' Sade 1, c ne sw 28-18n-4w, Hoover 3479 ft, perf 3479-88 ft, 10 gas, 1250 lbs rock pressure, 3502 ft.

Marshall County—Cumberland: Pure's Little 5, c se sw se 28-5s-7e, McLish 5268 ft, flow 300 bbls 4 hrs, 5777 ft.

Noble County—E. Lucian: Danciger's Donohue 2, sw nw nw 4-20n-2w, 2nd Wx 5386 ft, abnd 5402 ft.

Noble County—Tonkawa: English's Franks 1, ne sw se 14-24n-1w, abnd 2290 ft.

Okfuskee County — N. Okemah: British American's Martin A-1, sw se se 35-12n-9e, Gilcrease 3084 ft, pb 3138 ft, shot 40 qts 3118-38 ft, drilled plug 3148 ft, pump 9 bbls, 3165 ft.

British American's Bloss B-1, sw ne sw 36-12n-9e, Gilcrease 3112 ft, shot 50 qts 3128-51 ft, flow 190 bbls, 3151 ft.

Brown & Bowles' Parson A-2, c sw ne 36-12n-9e, Gilcrease 3114 ft, abnd 3155 ft.

Okmulgee County—Mounds: Garr et al's Perkins 1, nw nw sw 24-16n-11e, 1st Dutcher 2229-2308 ft, 2nd Dutcher 2318-60 ft, pb 2360 ft, 5 gas, 2760 ft.

Osage County—Osage City: Moore's Tribe 6, c s½ nw nw 35-22n-8e, Bartlesville 2398 ft, pump 30 bbls 12 hrs, 2405 ft.

Osage County—Avant: Barnsdall's Osage 19, sw nw sw 17-23n-12e, Bartlesville 1444 ft, shot 40 qts 1508-53 ft, pump 5 bbls, 1565 ft.

Pawnee County—Cleveland: Geo. Marble's Anglin 1-A, c w¼ sw nw 31-21n-8e, Bartlesville 2390 ft, shot 40 qts 2412-30 ft, abnd 2444 ft.

Pawnee County—E. Watchorn: Alma Oil Co.'s Robedeaux 2, sw se se 26-23n-3e, Wx 3951 ft, flow 45 bbls per hr, 3955 ft.

J. E. Crosbie's Doyle 1, sw nw nw 36-23n-3e, Wilcox sd, flow 18 bbls per hr, 3912 ft.

Pottawatomie County—N. St. Louis: S. K. Vierson's Duncan 3, c ne se 21-8n-4e, Hunton 4017 ft, 3000 gals acid, flow 10 bbls oil once a week, 4028 ft.

Seminole County—NE Wewoka: J. A. Legon's Fee 1, c nw nw 16-8n-8e, Hunton 3976 ft, pay 3981-85 ft, flow 231 bbls, 4280 ft.

Seminole County—E. Earlsboro: R. Hughes' L. Foster 1, se nw nw 19-11n-8e, Wapanucka-Cromwell 3664 ft, abnd 3685 ft.

Sequoyah County—Unnamed: Western Oil & Gas' Brant Unit 1, c sw se 18-10n-26e, 3 gas, 500 lbs rock pressure, 2004 ft.

Stephens County—Velma: Skelly's Franklin 29, sw ne se 35-1s-5w, abnd 960 ft.

Tulsa County—Bixby: Sauter's Black 1, nw nw nw 5-17n-13e, Miss 1862 ft, flow 72 bbls, 1865 ft.

Tulsa County—Bird Creek: Sand Springs Home's Walker 1, ne sw sw 3-21n-13e, Wx sd 1783 ft, abnd 2276 ft.

OKLAHOMA WELLS DEEPENED

Creek County—Glenn: Gulf's Vowell 21, c n½ sw 16-17n-12e, otd 1593 ft, Glenn sd prod, pay 1534-1688 ft, 1688 ft.

Gulf's Berryhill 18, ne nw ne 17-17n-12e, otd 1544 ft, Glenn sd 1572 ft, shot 250 qts, abnd 1745 ft.

Noble County—E. Lucien: Danciger's Plummer 1, c s½ se ne 5-20n-2w, otd 5413 ft, Mise 5220 ft, Viola 5225 ft, perf csg, flow 55 bbls, 5443 ft.

Osage County—N. Manion: J. S. Lambertson's Osage 12, ne sw se 19-23n-9e, otd 475 ft, sand 564 ft, salt water disposal well.

Pawnee County—N. Terlton: Vernie Pet.'s Cotton 4, c w½ sw ne 6-20n-8e, otd 2617 ft, Miss lime prod 2640 ft, 1000 gals acid, pump 24 bbls oil 72 bbls wtr, 2840 ft.

Pottawatomie County — St. Louis: Reda Pump's Akerman 1, nw se sw 4-6n-5e, otd 4095 ft, green shale 4170-71 ft, abnd 4177 ft.

Seminole County — E. Earlsboro: Sinclair Prairie's Hooper 1, ne nw se 19-9n-6e, otd 4184 ft, Wx 4137 ft, shot 10 qts 4230-40 ft, pump 20 bbls, 4243 ft.

OKLAHOMA WILDCAT COMPLETIONS

Creek County—New Gas Field: Selby et al's Gibson 1, ne nw nw 31-14n-7e, Hogs 1550 ft, Lay 1665 ft, Ccb 1945 ft, Cleve 1990 ft, Osw 2825-45 ft, Prue 2856 ft, 9,500,000 gas, 965 lb rp, td 2879 ft.

Logan County—Failure: Lewis Prod. Co.'s Nessling 1, c ne sw 24-18n-1w, Bird Creek 1890 ft, Deer Creek 2020 ft, Lecompton 2220 ft, U. Hoover 2260 ft, L. Hoover 2460 ft, Oread 2670 ft, Indi. 2730 ft, Avant 3240 ft, Dewey 3350 ft, Perry gas 3430 ft, Osw 4430

ft, pink lime 4790 ft, Bart 4854-72 ft, Miss 4908 ft, Wood 5080 ft, Syl 5130 ft, Viola 5226 ft, Dense 5253 ft, Dolo 5272 ft, Wx 5393 ft, abnd 5389 ft.

Okfuskee County—Failure: Richard Hughes' Foster 1, se nw nw 19-11n-8e, Cromwell 3666 ft, abnd 3685 ft.

OKLAHOMA WILDCAT STARTS

Creek County: L. B. Jackson's Noble 1, c ne nw 3-19n-8e, dr 850 ft.

Garvin County: Amerada's House 1, c se nw 2-1n-3w, dr 5020 ft in lime.

Greer County: Stauffer Pet. Co.'s Beaughcamp 1, c ne se 1-4n-21w, cellar.

Kiowa County: J. Ben Russell's Houston 1, nw sw sw 26-7n-14w, machine.

Logan County: Keener O & E's Anderson 1, ne sw ne 28-15n-1e, lcn.

Pittsburg County: Phillips' Bowlby 1, ne nw ne 4-5n-12e, rig.

Pottawatomie County: Phillips' Burgess 1, c se nw 7-6n-5e, lcn.

Kerlyn and Continental's Weaver 1, nw ne ne 32-8n-3e, rur.

Stanolind et al's Bleeker 1-A, nw se sw 28-10n-2e, br.

Tillman County: Kerlyn Oil Co.'s Hinson 1, ne se se 33-2s-17w, lcn.

Kansas

New Arbuckle Pool In Barton County

New Arbuckle pool in Barton. Testing shows in Douglas section. Attempt to extend Lindsborg-Bean trend.

Barton County: A new Arbuckle lime pool has been added at Phillips Petroleum Co.'s Frieb 1, SEc, SW 33-17-14w, which set pipe at 3441 ft in the lime with bottom of the hole at 3451 ft. After treatment, well gained temporary potential of 47 bbls daily, with gravity tested to 37 API.

Barber County: Great Lakes Carbon's Welsch 1, NW SW SE 30-31-15w, an anticline test, found saturation in Douglas section at 4234-49 ft, and is making production tests through perforations. Pipe is set in Arbuckle at 5305 ft.

McPherson County: Another location has been staked in the active wildcat area of the county as an attempt to extend the evident trend of Lindsborg and Bean production. Well is Lario Oil Co.'s Errickson 1, C SE SW 35-17-4w, southwest of both producing sectors.

KANSAS FIELD COMPLETIONS

Barber County—Sun City: Great Lakes Carbon's Shutts 2, nw sw ne 35-30s-15w, Arb 4621 ft, abnd 4651 ft.

Barton County — Kraft Prusa: Magnolia's Riemann 5, ne ne sw 4-17s-11w, Arb 3299 ft, 100 gals acid, pump 400 bbls, 3311 ft.

Butler County—Eldorado: Cities Service's Chesney 123, nw sw ne 21-25s-5e, Marmaton 2166 ft, shot 40 qts 2173-89 ft, pump 35 bbls, 2194 ft.

Butler County—Deichman: Trees Oil Co.'s Franks 2, se se se 23-31s-4e, Miss Chat 2940 ft, abnd 2943 ft.

Cowley County—Wildcat: Wolf Creek Oil Co.'s Hawley 1, c sw se 9-35s-4e, Miss lime 3334 ft, abnd 3361 ft.

Ellsworth County — Wilkens: Mid - Plains' Alden 4, c n½ sw se 32-17s-9w, Arb 3256 ft, salt water disposal well, 3500 ft.

Greenwood County—Beaumont: K. T. Wiedemann's Stewart 1, c ne se 12-27s-8e, Arb 2789 ft, abnd 2791 ft.

K. T. Wiedemann's Lewis A-19, c sw ne 35-27s-8e, Miss 2535 ft, abnd 2728 ft.

Jefferson County — McLouth: McLaughlin's Miller 1, c n½ sw sw 29-9s-20e, abnd 427 ft.

McPherson County — Unnamed: Winkler-Koch's Blessing 1, c s½ ne ne 27-17s-1w, Miss Chat 2765 ft, 2907 bbls, 2782 ft.

McPherson County—Lindsborg: Auto Ordnance's Hoglund 2, c w½ nw nw 18-17s-3w, Viola 3395 ft, 3100 gals acid, pump 617 bbls, 3400 ft.

Reno County—Peace Creek: Republic Nat.'s Werner 3, c sw nw 15-23s-10w, Viola 3749 ft, 8000 gals acid, flow 3000 bbls, 3778 ft.

Cities Service's Krey C-2, sw se ne 22-23s-10w, Viola 3786 ft, pay 2787-88 ft, 500 gals acid, 500 gals jet acid, pump 16 bbls oil 75 bbls wtr 8 hrs, 3792 ft.

Auto Ordnance's Hollenback 3, sw se sw 28-23s-10w, Viola 3820 ft, abnd 3858 ft.

Reno County — Zenith: Auto Ordnance's Volker 2, c nw sw 6-24s-10w, Viola 3720 ft, 7866 bbls fluid 15 percent wtr, 3758 ft.

Rice County—Chase: Bishop's Callis 1, sw se se 22-19s-9w, Arb 3196 ft, 2500 gals acid, shot 32 qts, 500 gals acid, pump 475 bbls, 3232 ft.

Rice County—Raymond: Hyde & Stormfeidt's Chas. Koenig 1, c s½ nw ne 15-20s-10w, Lans 3102 ft, pay 3170-82 ft, 6000 gals acid, pump 7 bbls 4 hrs, 3115 ft.

Rooks County—Dopita: Phillips and Continental's Rusk 1, c nw nw 31-8s-17w, Arb 3385 ft, 2500 gals acid, pump 30 bbls, 3389 ft.

Russell County—Semi-Wildcat: Hartman & Blair's Howland 1, sw sw se 34-13s-14w, Granite 3350 ft, hfw 3110-15 ft in Lans, abnd 3353 ft.

Russell County—Gasaston: H. Gore's Miller 1, ne se ne 15-15s-12w, Lans 2878 ft, pay 2893-98 ft, pay 2965-67 ft, rip csg, 5500 gals acid, pump 289 bbls, 2973 ft.

Stafford County—E. Drech: Atlantic's Hitz 1, c sw sw 7-22s-12w, Arb 3679 ft, swab 1396 bbls, 3682 ft.

OLD WELLS DEEPENED

Barton County—Silica: Selby Oil Co.'s Curchart 1, c n½ se ne 14-20s-11w, otd 3340 ft, Granite Wash 3815 ft, 90 bbls hr, 3815 ft.

McPherson County—Lindsborg: Auto Ordnance's Melander 1, c sw nw 9-17s-3w, otd 3466 ft, Pre-Cambrian 3985 ft, abnd 4092 ft.

KANSAS WILDCAT COMPLETIONS

Barton County—Failure: Ramsey's Heinz 1, se sw se 4-18s-11w, Anhy 615 ft, Lans 3020 ft, Base KC 3277 ft, Congl 3277 ft, Arb 3335 ft, abnd 3335 ft.

Butler County—Failure: Adair & Morton et al's Pattison 1, se se nw 10-26s-6e, Lans 1785 ft, KC 2080 ft, Miss 2748 ft, Base Miss 3076 ft, Viola 3147 ft, sso 3154-58 ft, hfw 3154-62 ft, Base Viola 3168 ft, Simp sd 3168-75 ft, abnd 3175 ft.

Cowley County—Failure: Wolf Creek Oil Co.'s Hawley 1, c sw se 9-35s-4e, Layton 2495 ft, Miss 3300 ft, sso 3334-39 ft, abnd 3361 ft.

Graham County—Failure: R. W. Shields' Arbuthnot 1, nw ne ne 18-8s-21w, Anhy 1540 ft, Topeka 3010 ft, Lans 3249 ft, Congl 3592 ft, Arb 3601-35 ft, abnd 3635 ft.

Greenwood County—Failure: K. T. Weidemann's Stewart 1, c ne se 12-27s-8e, KC 1693 ft, sso 1810 ft, Miss 2443 ft, Base Miss 2717 ft, Wx 2783 ft, Arb 2789 ft, abnd 2791 ft.

McPherson County—Failure: Globe O & R Co.'s Anderson 1, sw sw sw 22-17s-3w, Miss 2979 ft, B. Miss 3257 ft, Viola 3494 ft, Simp shale 3618 ft, Simp sand 3623 ft, Arb 3692 ft, abnd 3728 ft.

Norton County — Failure: Helmerich & Payne's Paxton 1, c ne sw 10-4s-24w, Anhy

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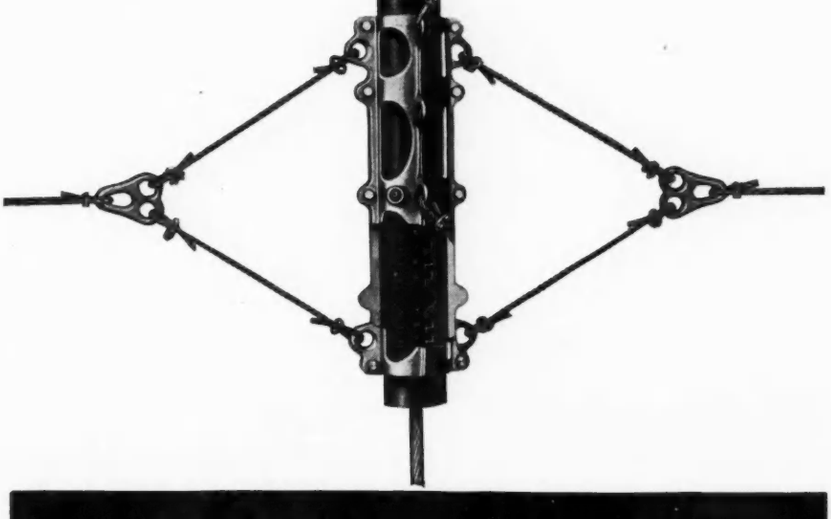

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Rush County—Failure: Continental's Munch 1, nw ne ne 9-16s-19w, Anhy 1264 ft, Lans 3367 ft, Basal sd 3670-73 ft, abnd 3680 ft.

Saline County — Failure: Auto Ordnance Corp.'s Ruch 1, se ne nw 25-13s-2w, Topeka 1410 ft, Lans 2050 ft, Miss 2537 ft, B. Miss 2750 ft, Mise Dolo 2897 ft, Hunton 2913 ft, Syl 3026 ft, Viola 3127 ft, Poro 3127-33 ft, ns, Simp sandy lime 3251 ft, Simp sand 3279 ft, Arb 3310 ft, abnd 3320 ft.

KANSAS WILDCAT STARTS

Barton County: Hollow Dr. Co.'s Debes 1, c w½ sw nw 30-17s-11w, rur.

Cowley County: Ingling & Parker's Eastman 1, se se sw 7-31s-6e, lcn.

Graham County: N. Appleman's Buss 1, nw ne sw 1-9s-22w, lcn.

Marion County: Nelson Dr. Co.'s Hacker 1, sw ne ne 6-17s-1e, dr 950 ft.

Rice County: Bay Pet. Co.'s Lackey 1, nw nw ne 29-21s-7w, cellar.

Rush County: Vickers' Steitz 1, c s½ sw se 17-19s-18w, rur.

Sedgwick County: Aylward Prod. Co. and Atlantic's Draper 1, c n½ ne ne 34-29s-2w, rur.

Stafford County: Herndon Dr. Co.'s Lynn 1, se se nw 12-21s-11w, sd 2035 ft.

Woodson County: C. E. Ash's Tuckett 1, se se se 34-25s-14e, dr 600 ft.

NEW MEXICO FIELD COMPLETIONS

Eddy County: W. F. Dodson et al's Danciger 2-G, c nw nw 26-17s-30e, flow 75 bbls, 2-in, shot 130 qts 3170-93 ft, td 3240 ft.

Nay Hightower et al's Grier 4-A, 1980 ft from n and 3325 ft from e lines 31-16s-31e, flow 500 bbls, 2-in, 3025-3135 ft.

Payton Bros.' Magruder 5, nw se se 35-17s-27e, flow 70 bbls, 2-in, acid 1000 gals 482-502 ft.

Premier Pet. Corp.'s Arnold 2-C, c ne ne 26-17s-30e, flow 744 bbls, 2-in, shot 120 qts 3202-34 ft.

Lea County—Monument: E. B. Clark et al's Cooper 2, c se nw 3-20s-37e, flow 630 bbls, 2-in, acid 3000 gals 3820-94 ft.

NEW MEXICO OLD WELL DEEPENED

Lea County—Monument: G. M. McGarr et al's Weir 1-A, nw nw sw 3-20s-37e, otd 3876 ft, flow 130 bbls, 2-in, acid 3000 gals 3850-76 ft, td 3906 ft, pb to 3876 ft.

NEW MEXICO WILDCAT STARTS

Eddy County: Heacock & Owens' Yates 1, sw ne ne 6-20s-27e, sp.

Lea County: Maljamar O&G Corp.'s Chessman 1, c ne ne 22-18s-32e, lcn.

Quay County: Stanolind's J. W. Fuller 1, c ne ne 25-2n-30e, Frio Dome, lcn for 7000-ft, or Ellenburger test.

West Texas

Wildcat Work Continues Brisk

Ordovician project included in trio of wildcats assigned Crockett County. Yoakum County prospect to explore Clear Fork series. West portion Barnhart field given another outpost as this sector is most productive. Big crop of wildcats nearing decisive stage.

Crockett County: Moore Bros. et al awarded drilling contract for J. S. Todd 1, C SW SW EL 16, Blk Y-Z, which will drill to water in Ellenburger, or 7500 ft. It is 5 miles west of Crinoidal lime producer in West Todd pool, and same distance east by north of 6160-ft failure. Moore Bros. also let contract for regular lime tests on Shannon ranch, C SW SW I&GN 21, Blk Y-Z, and C NW NW Sec 12, John Small sur. Texas Pacific Coal & Oil Co.'s Fee 1, northeast edge of Soma-Noelke field, earned initial rating of 431 bbls of 22-gr oil, ½-in choke, natural, Yates sand 1526-60 ft. Negotiations are underway for drilling a 5000-ft Clear Fork test in this sector by A. J. Rife and Floyd Scott.

Yoakum County: Barnsdall Oil Co.'s Heath 1, C NE NE Sec 315, 6 miles northeast of Plains, is contracted to 7500 ft to explore the Clear Fork series.

Winkler County: Amon G. Carter et al's Walton-Pure 2-C, projected 10,000-ft test for Keystone field, was drilling lime at 6320 ft, having yielded 120 ft of rotary mud with trace of oil when tester was used at 5725-6040 ft. Shell's Blue 1, east edge of county, was drilling lime 7735 ft. Nominal shows passed up at several levels in Clear Fork.

Crane County: Magnolia's Tucker 1, ¼ mile northeast of its McKee pool discovery at 6125-86 ft, proved dry in this zone and was drilling shale at 6340 ft to explore Ellenburger.

Reagan County: A west outpost is included in two new tests assigned Barnhart pool by Amerada after its University 1-R-I, south offset to most westerly producer, showed for one of largest wells in area in flowing 500 bbls (estimated) in pits in 6 hours while cleaning itself through 1-in, then tanked 146 bbls of oil in 2 hours, 1-in choke. Used 5000 gals of acid through Ellenburger perforations at 9175-9230 ft, elevation 2776 ft. Amerada's University 1-R-H, ¼ mile east, flowed natural from perforations in upper pay at 9105-74 ft, then squeezed to complete in main pay at 9184-94 ft. University 1-R-M will try for ¾ mile west extension, and University 1-R-L is southwest offset to discovery.

Farmouts: Two semi-wildcats on a strike between the Taylor-Link and Walker fields, Pecos County, are to be drilled on acreage subleased by Shell, which retained deep rights and sliding scale over-ride. Milton Unger and associates were assigned an aggregate of 360 acres for test in N½ Sec 34, while Hightower Oil & Refining Co. received lease on SE Sec 27 for a test. All acreage is in Blk 16. Assignees required to post $3,000 forfeit each against starting of test within 30 days. Shell has contributed acreage to Mascho Oil Co. for the drilling of a projected Clear Fork, or 7500-ft test in NW PSL 23, Blk A-37, 3 miles sw of Fullerton pool, Andrews County.

WEST TEXAS FIELD COMPLETIONS

Andrews County—Embar Ellenburger: Phillips' University-Andrews 10, c ne se sec 36, blk 11, elev 3257 ft, Yates sand 2650 ft, lime 4035 ft, Clear Fork 5455 ft, Wolfcamp 7685 ft, Simpson 7730 ft, Ellenburger 8090 ft, abnd 8120 ft.

Cochran County — Slaughter: Devonian et al's Duggan 14-A, 580 ft out SWc lab 2, leag 55, Oldham CSL, flow 1018 bbls, 2-in, acid 12,000 gals 4970-5025 ft.

Crockett County—Soma-Noelke: T.P. Coal & Oil Co.'s Fee 1, 2140 ft from n and 330 ft from w lines sec 27, blk GG, M. T. Wilton sur, flow 431 bbls, ½-in, Yates sand 1526-60 ft.

Gaines County — Cedar Lake: Stanolind's Bremont 7, c ne nw PSL 3, blk C-30, swab 386 bbls, shot 540 qts, 4685-4805 ft, td 4810 ft.

Hockley County—Slaughter: L. G. Glasco et al's Mallet 1-C, 580 ft out NWc lab 22, leag 47, Edwards CSL, flow 926 bbls, 2-in, acid 10,000 gals 4932-77 ft.

Jerry Hawkins et al's Mallet 16-A, 580 ft out SWc lab 22, leag 47, Edwards CSL, flow 827 bbls cas, acid 11,500 gals 4958-5010 ft.

Ward County — Byrd: Stanolind-Atlantic's Wood 1, 1993 ft from nw and 1980 ft from sw lines H&TC 34, blk 34, flow 111 bbls, 3/32-in, shot 90 qts 2580-2605 ft, td 2608 ft.

Winkler County—Keystone: Parker Dr. Co.'s Baird 1, 440 ft out NWc e-100-ac ne PSL 12, blk B-3, flow 45 bbls, ½-in, shot 420 qts 3260-3427 ft, td 3435 ft.

Yoakum County—Wasson: Argo Oil Corp.'s Evans 1, 330 ft out NEc PSL 36-A, blk AX, flow 227 bbls, 7/32-in, acid 13,000 gals, 4915-5030 ft.

WEST CENTRAL TEXAS FIELD COMPLETIONS

Comanche County: L. H. Choate et al's Seale 1, 233 ft out nec 104-ac tr, e part ET 1, A-291, abnd 675 ft.

Jones County: Ernest L. Wilson et al's Mashburn 2, 330 ft out sec nw blk 86, DeWitt CSL, leag 126, flow 1334 bbls, ¾-in, acid 3000 gals Hope lime 2278-2301 ft.

WEST CENTRAL TEXAS WILDCAT COMPLETIONS

Brown County—Gas Discoveries: Wm. D. Austin et al's Williams 1, sw se se HT&B 40, 260,000 ft gas, broken pay 1358-63 and 1419-25 ft, td 1437 ft, pb to 1433 ft.

Central Texas Gas Co.-J. B. Whitesides' Kirkpatrick 1, 2000 ft from nw and 1200 ft from ne lines John Greenwood sur, 8 mi sw Brownwood, 250,000 ft gas, acid 4000 gals Ranger broken pay 1287-1450 ft, td 1458 ft.

Shackelford County—Failure: C. J. Kleiner & Heitzel's Nail 1, 640 ft from s and 2310 ft from e lines ET 147, abnd 1875 ft.

WEST CENTRAL TEXAS WILDCAT START

Coleman County: T. S. Stanfield et al's Verches 1, 1200 ft from n and 900 ft from e lines blk 4, L. C. Manson sur 80, lcn.

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Trading Post Section, THE OIL WEEKLY

P. O. Box 2608 Houston, Texas

North Texas

Mississippi Productive In Clay County Wildcat

Clay County has new oil pool from Mississippi lime. Strawn discovery looms for Eastern Archer County. Forestburg pool widened to northwest. More development due on east flank of Walnut Bend field.

Clay County: J. S. Youngblood and R. L. Foree's Sanzenbacher-Gulf 1, 5 miles east by north of Halsell pool, is showing for 50- to 75-bbl pumper after 2-stage treatment with 8000 gals of acid through perforations at 5994-6045 ft in upper saturation in Mississippi. Additional perforations are to be made 50 ft lower, then reacidize. Shell's Henderson 1, southeast edge of Antelope pool, was drilling at 2420 ft after indicating oil production in broken sand at 865-88 ft that will be tested later.

Archer County: Whitaker Oil Co.'s Coleman 1, NW C Brazos CSL 25, 3 miles ne of Scotland pool, yielded adequate oil- and gas-cut mud on brief drill-stem tests to indicate opening of a new oil pool. Production is from broken sand in Strawn at 3690-3721 ft, elevation 998 ft. Electric log confirmed the show, and 7-in has been cemented at 3690 ft to try for completion. Company holds large lease block.

Montague County: Sinclair-Prairie's Steadham 1, northwest outpost for Forestburg pool, flowed 1237 bbls initial, open tubing, acidized Marble Falls 7157-7204 ft. This is fifth producer for area. Company's Jones 5, south offset to discovery, swabbed 46 bbls in 24 hrs from Marble Falls at 7179-99 ft, and will be acidized. Jones 6 was carried through pay, topped at 7111 ft, to 7290 ft, and is awaiting casing. Continental's Ketchum 1, wildcat 2 miles east of Bowie that has been in process of completion for some weeks, pumped 30 bbls of oil and 25 bbls of water on 20-hr test from Strawn at 3330-36 ft, having plugged back from 7506 ft.

Wildcats: Tom D. Humphrey's Barton 1, 9½ miles west by north of New Castle, Young County, is awaiting orders at 4745 ft, with nominal saturation in Mississippian topped at 4730 ft. Ben Rankin et al's Graham, 16 miles southwest Graham is standing at 4587 ft in salt water; topped Bend and Mississippi at 3605 ft and 4141 ft, respectively, with some encouragement for production in each. In Baylor County, Whitaker Oil Co.'s Farmers Bank 1 abandoned in Canyon water zone at 2687-99 ft.

Cooke County: Further expansion of Walnut Bend to east became evident when Sinclair Prairie's Atkins 13, C. Furinash Sur, flowed potential of 562 bbls through open tubing, from Snuggs sand at 4941-54 ft. It is on the east edge. Company recently added to its holdings on east side of structure.

NORTH TEXAS FIELD COMPLETIONS

Archer County—Scotland: Shell's Coleman 5-C, 330 ft from n and 455 ft from e lines lot 4, ATNCL 73, Bend 5145 ft, pump 32 bbls, acid 4000 gals and shot 30 qts 5183-5203 ft, td 5250 ft.

Clay County—New York City: Shell's Anderson 2, 2150 ft n and 330 ft e of m/s/sw corner T&NO 5, Bend 5840 ft, Mississippi 6161 ft, flow 2496 bbls, plus 272 bbls acid water, 2-in, acid 2000 gals 6161-6204 ft.

Clay County: Sid Taylor et al's Perkins-Cullum 2, 680 ft from nw and 1000 ft from nw lines blk 38, Bacon subdiv, abnd 1115 ft.

Wilder Dr. Co.'s Taylor 1-B, 330 ft out SEc blk 33, Bacon subdiv, pump 10 bbls, sand 1076-83 ft.

Clay County—Ringgold: Gulf's Worsham-Spring 8, 2894 ft from n and 750 ft from w lines H&TC 35, blk 4, top Bend 5509 ft, Ellenburger 5667 ft, pump 164 bbls, shot 500 qts 5540-5669 ft, td 5855 ft, pb to 5679 ft.

Cooke County—Walnut Bend: Sinclair Prairie's Atkins 13, 330 ft from n and 2970 ft from w lines 198.2-ac tr, C. Furinash sur, flow 559 bbls 2-in, Snuggs sand 4941-54 ft.

Montague County—Forestburg: Sinclair Prairie's Steadham 1, 475 ft from nw and 575 ft from ne lines G. W. Fanning sur, Marble Falls 7126 ft, flow 1237 bbls, 2½-in, acid 2500 gals 7157-7204 ft.

Wichita County—K-M-A Ellenburger: E. C. Oil Co.'s Mangold 34 E, 660 ft from n and 495 ft from w lines blk 33, P. Castleman sur, flow 470 bbls, 2-in, acid 3000 gals 4339-81 ft.

Wichita County: Continental's Waggoner Est. 15-D, 910 ft from s and 660 ft from e lines s½ sw H&TC 33, blk 5, abnd 510 ft.

Martin Properties' Ramming 1, 2536 ft from e and 330 ft from n lines lot 2, H. Hastie sur A-92, abnd 1325 ft.

Wilbarger County: Phillips' Waggoner Est. 8-OO, 13 ft from e and 1950 ft from s lines H&TC 47, blk 2, pump 32 bbls, shot 40 qts 1874-90 ft, td 1895 ft.

Young County—Padgitt: Shell's Bullock 1-B, 467 ft from s and 1409 ft from e lines TE&L 336, top Bend 4304 ft, Miss 4733 ft, Ellenburger 4957 ft, abnd 4959 ft.

NORTH TEXAS WILDCAT COMPLETIONS

Archer County — Failures: Whitaker Oil Co.'s Frey 1, c ne sw sec 16, Palo Pinto CSL, top KMA lime 3914 ft, abnd 4411 ft.

W. T. Hutcheson Jr. et al's Wood 1, 330 ft out SEc 80-ac lse, w½ sec 2, blk 5, Clark-Plumb sur, abnd 1075 ft.

White & Duncan's Kinder 2, 990 ft out SEc sec 96, blk 4, Clark-Plumb sur, abnd 1250 ft.

Baylor County—Failure: Whitaker Oil Co.-J. C. Hanks' Farmers Bank 1, nw nw nw T&NO 207, top lime 2687 ft, abnd 2699 ft.

NORTH TEXAS WILDCAT STARTS

Jack County: L. S. Youngblood-R. L. Foree's R. B. Fulcher-Gulf 1, 330 ft out NWc Z. N. Morrell sur A-311, 3 mi e Post Oak, lcn 6400-ft test.

Wichita County: Geo. Proctor et al's Robinson 1, 330 ft out SEc Waggoner Colony sec 305, lcn 2000-ft test.

Young County: Fleming Oil Co. et al's Graham 2, 530 ft from e and 1399 ft from n lines w½ TE&L 2912, lcn 5000-ft test.

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East Texas

Wood County Paluxy Strike Looks Promising

East Texas Basin records its fifth producing area from Paluxy, and second for Wood County. Discovery yields high-gravity sweet crude in contrast to low-gravity oil, or distillate in the others.

Wood County: Delta Drilling Co. and Rube Benton's Goldsmith-Shell 1, S. G. Purse Survey, opened an oil pool 2½ miles northwest of Quitman and 7¾ miles southwest of Coke field in flowing natural on initial test December 1 through perforations in the main Paluxy pay at 6280-6310 ft after fixing the water level at 6456-6544 ft. The well flowed 181 bbls of 43-gr oil through ¼-in tubing choke on 3-hr test, gas-oil ratio 316/1, and was increasing its output after cleaning rotary fluid from the hole. Electric log placed top of Paluxy series at 6251 ft, elevation 485 ft, broken oil sand at 6278-98 ft, maximum porosity and saturation at 6298-6310 ft, with possible pay in broken sand at 6312-16 ft and 6380-85 ft.

This discovery is on acreage donated by Shell, largest lease owner in area, and was contracted to drill to Travis Peak, or complete a 200-bbl well in order to collect bottom-hole money. Other lease owners are Sun, Amerada, Barnsdall, Gulf and Magnolia. Nearest pipe lines involve Gulf's multiple system in eastern Wood County, and Pure's Van fields outlet. Humble serves the Hawkins field in southeastern Wood County, but this Woodbine field yields low-gravity asphalt crude.

Geophysical information, supported by subsurface derived from Woodbine failures, indicates that the Quitman strike may embrace a large structure, extending northeast to southwest. Experience gained from development of the Coke field revealed that Paluxy "highs" prevail at close intervals in this sector of the basin, but that ability to produce will be erratic as the Strake prospect immediately west of the Coke field is relatively higher. Four to six Paluxy prospects are now pending, including another test on Wm. Barnhill survey, southeast of Coke field and near a failure that preceded the Coke discovery. Bobby Manziel has arranged a farmout from Shell for a test. Danciger Oil & Refineries, Inc., has contracted to drill a Paluxy test near south end of S. W. Mitchell survey, five miles northeast of Quitman. The Alba structure is assured of a test, although non-productive in Woodbine. Magnolia has a block in northwest part of county that is to be explored shortly.

EAST TEXAS FIELD COMPLETIONS

Wood County—Coke: Amerada's Yates 1, 1050 ft from s and 1150 ft from e lines Jos. Knight sur, elev 513 ft, top Paluxy 6320 ft, flow 6 bbls, 10/64-in, perforations 6346-57 ft, td 6385 ft.

Amerada's Gilbreath 1, 330 ft from n and 915 ft from w lines 31.45-ac tr, Dan Townsend sur, elev 508 ft, flow 384 bbls 25.5-gr natural, ½-in, Paluxy perf 6328-53 ft, td 6358 ft.

Wood County—Hawkins: Humble's Wyatt 4, 1190 ft e and 1340 ft s of NWc Wm. Herrington sur, flow 129 bbls ¼-in, perf 4837-55 ft, td 4883 ft.

Texas Co.'s Cobb 2, 467 ft from n and 649 ft from e lines lse, H. F. Robinson sur, elev 342 ft, pump 106 bbls, plus 8 to 14% bs&w, perf 4658-4710 and 4768-96 ft, td 4837 ft.

EAST TEXAS WILDCAT COMPLETIONS

Freestone County—Failure: J. B. Daniel et al's Johnson 1, 6780 ft from se and 1550 ft from sw lines J. L. Bennett sur, elev 410 ft, Austin chalk 2726-3181 ft, abnd 3835 ft.

Henderson County — Failure: Bobby Manziel et al's Levine 1-B, 520 ft from w and 2000 ft from s lines 185-ac lse, Johnathan Ping sur, elev 315 ft, top Pecan chalk 2110 ft, abnd 3950 ft.

Kaufman County—Failure: Jas. F. Milton and Martin's Rutland Bank 1, 11,424 ft from w and 1864 ft from n lines 921-ac tr, John Baker sur, Pecan 1506-1607 ft, Austin 2282-2677 ft, top Woodbine 3079 ft, abnd 3190 ft.

TEXAS PANHANDLE FIELD COMPLETIONS

Carson County: Skelly's Schafer 161, 440 ft out NEc se I&GN 197, blk 3, pump 168 bbls, shot 587 qts 3009-3122 ft.

Gray County: Phillips' Clay-Bass 1, se se nw H&GN 176, blk B-2, 20,800,000 gas, 434 lbs rp, lime 2950-90 ft, td 3250 ft, pb to 3000 ft.

Moore County: Phillips' O'Hern 1, 2495 ft out SWc H&TC 277, blk 44, elev 3630 ft, 19,000,000 gas, 372 lbs rp, acid 5000 gals 3018-3250, td 3310 ft, pb to 3250 ft.

Red River Gas Co.'s Shelton 5-A, 1583 ft from e and 3552 ft from m/n/n lines H&TC 50, blk 47, 30,700,000 gas, 280 lbs rp, acid 10,000 gals 2250-2471 ft.

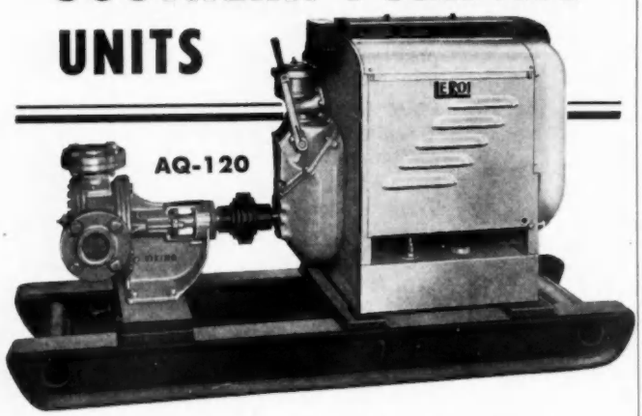
Southwest Texas

Refugio County Well Making More Tests

Refugio County wildcat makes additional tests after flowing gas and distillate. Goliad County well tests oil and water.

Refugio County:. Gulf is testing through new perforations at 8310-36 ft in Tatton 1, wildcat in Essey Reed survey, A-251, 3½ miles southeast of Tomoconnor field, after squeezing at 8460-80 ft. This latter section flowed a spray of distillate and some gas and later built up 4100 pounds pressure when

SOUTHERN PUMPING UNITS



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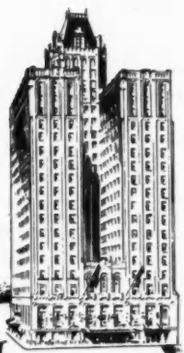

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shut in. The hole is bottomed at 8680 ft with 7-in set to 8543 ft.

Goliad County: Fain Drilling Co. and Dan Auld are drilling deeper in Pettus 1, wildcat 5 miles northeast of Charco in S. Vela survey. One sand was cored at 7800-18 ft that showed 890 ft of oil cut salty water and 270 ft of oil cut mud on a drill-stem test, using 2000 ft of water cushion. The well showed a blow of gas but little pressure. Another sand in Wilcox at 7670-78 ft showed a small amount of gas.

Jackson County: John B. Coffee tested gas and distillate from new sand in Mauritz 3-B, on east flank of West Mauritz production. Perforations were made at 5596-98 ft in new 5600-ft sand, around 132 ft below the 5470-ft discovery pay. First perforations were made at 5604-08 ft were squeezed after failing to produce commercially. Total depth is 5850 ft with 5½-in set to 5675 ft.

Jim Wells County: Texas Co. is making squeeze job preparatory to second production test in Tijerina 1, outpost to Seeligson field. First perforations were made at 5660-64 ft, but water broke into flow and holes were squeezed to shut off the water channeling.

Caldwell County: John Deering is making flow tests in Union Central 1, wildcat 4 miles south of Lockhart. Perforations were made at 2194-2240 ft in Austin chalk. Total depth is 2401 ft with Edwards lime topped at 2388 ft, 7-in set to 2390 ft.

Potential: Guy I. Warren's Freeman 1, wildcat discovery of Mustang Creek field, Jackson County, flowed 115 barrels through 9/64-in choke after making perforations at 6644-48 ft. Sand was topped at 6641 ft, total depth 6651 ft.

LOWER TEXAS COAST FIELD COMPLETIONS

Jackson County — Mayo: Louis Crouch's Kahanek 1, 600 ft fr se & swl's ne 80-ac tr, M. L. Angle sur, 5½-in 5565 ft, perf 5425-30 ft, 77 bbls 764-in, td 5566 ft.

Jackson County—North LaWard: Hewit & Dougherty's Owens 3, 554 ft fr s&el's blk 14, 284-ac tr, Pickering Ranch subdvn, Patrick Scott sur, 5½-in 5643 ft, perf 5202-16 ft, 102 bbls, ½-in, td 5651 ft.

Jim Wells County—Quinto Creek: Kilgore Developers' Weldon 1-A, 467 ft fr nw&swl tr 16, 160-ac tr, Casa Blanca gr, abnd 5900 ft.

Jim Wells County—Seeligson: Shell's Seeligson 15, 3175 ft fr nl & 631 ft fr w'ly wl 990-ac tr, Willis Millican sur, 5½-in 6043 ft, perf 5971-6010 ft, 150 bbls 7/64-in, td 6060 ft.

LOWER TEXAS COAST WILDCAT COMPLETIONS

Bee County—Failure: J. W. Gorman and Scheig Bros.' Kubala 1, Clareville area, abnd 4071 ft.

Jackson County — Discovery: Texas Co.'s Collier 2, 1980 ft fr swl & 660 ft fr nwl of ne 230-ac tr, James Kerr sur, 7-in 2432 ft, flow 202 bbls, 11/64-in, td 2455 ft.

Refugio County—Failure: P. R. Rutherford's Fagan 1-F, Tivoli area, 1400-ac tr, Mary Byrne sur, abnd 6515 ft.

LOWER TEXAS COAST WILDCAT STARTS

Goliad County: Ginther, Warren & Ginther's Wood 2, Sarco Creek area, c 40-ac, lot 7, R. B. Swiger subdvn, 1487-ac tr Carrie G. Wood ranch, 2000-ft test.

Victoria County: LaGloria Corp.'s Hopkins 1, Dacosta area, 660 ft fr ne & sel 216-ac lse, Allen Talbott sur, lcn 6400-ft test.

SOUTHWEST TEXAS FIELD COMPLETIONS

Starr County—Rincon: Humble's San Antonio Loan and Trust 2, 3300 ft fr nl & 660 ft fr el J. A. Robinson sur 504, 5½-in 3917 ft, perf 3890-3914 ft, flow 80 bbls, 3/16-in, td 3917 ft.

Starr County—Garcia: Sun's Frost National 2-B, 4085-ac tr, Y. Trevino sur, 5½-in 3752 ft, sand 3743 ft, 153 bbls, 9/64-in, td 3754 ft.

Starr County—North Sun: Sun's Rodriguez 1-B, 850 ft fr wl & 500 ft fr sl 169-ac tr, Santa Teresa gr, abnd 4858 ft.

SOUTHWEST TEXAS WILDCAT COMPLETIONS

LaSalle County—Failure: L. V. Manry's Talbert 1, Los Angeles area, IGN 149, abnd 5616 ft.

Webb County—Failure: Dulup Oil Co.'s Puig 1, Aviator area, 280-ac lse, blk 63, Albercas de Arriba gr, abnd 1938 ft.

SOUTHWEST TEXAS WILDCAT STARTS

McMullen County: Highland Oil Co.'s Cousins 1, 2½-mi nw South Campana field, ne BS&F 100, lcn 3000-ft test.

Zapata County: Dulup Oil Co.'s Killam & Bruni 1, Mirando City area, 400-ac lse, blk 5 sur 181, lcn 4500-ft test.

SOUTH CENTRAL TEXAS FIELD COMPLETION

Bastrop County—Lentz: H. F. Clayton's Lentz 1, 80-ac lse, Jacob Lentz sur, abnd 2288 ft.

SOUTH CENTRAL TEXAS WILDCAT COMPLETIONS

Gonzales County—Failure: Tex Harvey Oil Co.'s Lord 1, Nixon area, 447-ac tr, John Hubert sur, abnd 6616 ft.

Williamson County—Failure: H. C. LeFors Pfleuger 1, Taylor area, 300-ac lse, W. M. S. Parker sur, abnd 810 ft.

SOUTH CENTRAL TEXAS WILDCAT STARTS

Bexar County: Butcher-Arthur Co.'s Gembler 1, Elmendorf area, 101-ac tr, Juan Montez sur, lcn 2500-ft test.

Texas Gulf Coast

Katy Outpost Sets Pipe; 14,000-Foot Well Planned

Pipe set in northeast outpost at Katy, Harris County. Wildcat in Brazoria County may be drilled to 14,000 ft.

Harris County: Humble has set 7-in to 7454 ft in Scherff 1, wildcat on northeast side of Katy gas field and one mile from production, to make first flow test. The well, in J. W. McCutcheon survey, is bottomed at 7600 ft in shale.

Brazoria County: Humble may drill to 14,000 ft in Houston Farms 1-B, wildcat in Hall's Bayou area that is now

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making hole below 12,000 ft in shale. If the well reaches its objective it will be the deepest test yet drilled this side of the Rocky Mountains. The wildcat, located on a 5000-acre tract in Perry & Austin survey, A-109, was projected to 11,500 ft, but when this depth was reached decision was made to drill to the 14,000-ft level. Details have not been released on what has been encountered. The test is 1½ miles southwest of Strake's Griffin 1, 10,410-ft wildcat that found some oil but was not completed due to mechanical trouble.

TEXAS GULF COAST FIELD COMPLETIONS

Hardin County—Saratoga: Rio Bravo Oil Co.'s Fee 51, 110-ac tr, R. Teel sur, abnd 2133 ft.

Harris County—Clinton: Sun's Oates 1, 1576 ft fr sl, 1642 ft fr el 175-ac lse, Reels Trobaugh sur, abnd 4737 ft.

Montgomery County — Lake Creek: Superior's Damuth 1-A, 176-ac tr, T. J. Nichols sur, perf 9762-68 ft, gas, ungauged, td 12,100 ft.

San Jacinto County—Mercy: Shell's Goldston 3, 418-ac tr, Kelly Holliday sur, 5½-in 8252 ft, sand 8265 ft, flow 165 bbls, ½-in, td 8277 ft.

Shell's Central Coal & Coke 5, 5116-ac tr, J. Robinson sur, 5½-in 8248 ft, sand 8261 ft, 160 bbls, ¾-in, td 8280 ft.

TEXAS GULF COAST WILDCAT COMPLETION

Madison County—Failure: Pan American's Chambless 1, Madisonville area, 461ac tr, William F. Young sur, abnd 6505 ft.

TEXAS GULF COAST WILDCAT STARTS

Brazos County: Vee Tipt Oil Co.'s Stewart 1, College Station area, 417-ac tr, Stephen Jones sur 27, lcn 4500-ft test.

Harris County: O. W. Killam's Dodd 1, 3 m se Richardson field, 660 ft out of s'ly ne cor WCRR 13, lcn 7500-ft test.

Matagorda County: Superior Oil Co.'s Peterson 1, Van Vleck area, A. S. Sojourner A-13, 80-ac tr, lcn 10,000-ft test.

Louisiana Gulf Coast

Fresh Water Bayou Well Completed as Gasser

Fresh Water Bayou discovery completed as gas well. New sand opened on north flank Vinton dome.

Vermilion Parish: Union Oil Co. has completed its discovery in the Fresh Water Bayou (Chenier au Tigre) area as a gas producer after testing several sands yielding gas and distillate. The well, Louisiana Furs 1-C, 33-16s-2e, was last perforated at 11,126-34 ft flowing ungauged amount of gas and some distillate. Other perforations were made at 11,582-88 ft, 11,486-93 ft, 11,323-30 ft and 9950-60 ft.

Calcasieu Parish: Union Oil Co. has opened a new sand on north flank of old Vinton Dome with Gray 3-C flowing 127 barrels through 1/8-in choke from perforations at 4908-14 ft with 750 pounds pressure on tubing. This producer, located in 33-10s-12w, is bottomed at 5360 ft in sidetracked hole. Several tests were made before final completion.

Iberia Parish: Humble has spotted Petit Anse 4, 25-13s-5e, on southwest flank Avery Island dome, northwest of Petit Anse 2 discovery producer. The company is drilling Petit Anse 3 southeast of the discovery.

St. Mary Parish: Humble has spudded Miami Corp. 2-E, 44-16s-9e, east outpost to Bayou Sale field, and east of Miami Corp. 1-E which recently gave a major eastward extension to this deep field.

St. Charles Parish: Gulf is making further flow tests in Delta Securities 2, second well in Bayou Couba area. Last perforations were made in sand section at 6218-34 ft with 92 perforations. This well, north of the discovery producer, is in 13-15s-21e.

SOUTH LOUISIANA FIELD COMPLETIONS

Calcasieu Parish—Vinton: Union Sulphur's Gray 3-G, new sand north flank, 1630 ft fr e, 3785 ft fr sl 33-10s-12w, 5½-in 5360 ft, perf 4908-14 ft, 127 bbls, ⅜-in, td 5360 ft.

Cameron Parish—Big Lake: Union Sulphur's Hebert 1, 440 ft n&w of se nw se 18-12s-8w, temp abnd 9744 ft.

Evangeline Parish—Pine Prairie: Texas Co.'s La Danois 3-B, se flank, 1360 ft n, 1670 e sw c 35-3s-1w, 7-in 9500 ft, perf 9350-90 ft, 290 bbls, 12/64-in, td 9500 ft.

St. Landry Parish—Port Barre: Pan American's Garland 15, 4-6s-5e, 7-in 5298 ft, perf 5238-44 ft, 100 bbls, 9/64-in, td 5346 ft.

St. Martin Parish—Lake Chicot: Amerada's Schwing 1, 1720 ft e & 1080 ft s nw 31-11s-10e, 5½-in 8239 ft, perf 7722-32 ft, 165 bbls, ⅛-in, td 8252 ft.

St. Mary Parish—Bayou Sale: Humble's Luke 4, 17-16s-9e, perf 10,392-398 ft, 243 bbls, ⅛-in, td 10,480 ft.

Terrebonne Parish—Gibson: Shell's Pelican 11, 35-17s-15e, 5½-in 9270 ft, perf 9244-48 ft, 260 bbls, ⅛-in, td 9552 ft.

North Louisiana

New Field Indicated In North Bossier Parish

"Wildcat" indicates new field for Bossier Parish. Second test in Beekman field of Morehouse Parish abandoned. Caddo Parish wildcat quits.

Bossier Parish: A new Pettit lime producing area for the north end of the parish is indicated by H. L. Hunt's Nebo Oil Co. 1, SW SE 3-23n-12w, which is testing. A good flow of oil has been reported but no gauge has been made. Casing was perforated from 6029 to 6122 ft, but other data were not disclosed. Hole was drilled to 6386 ft. Early estimates placed flow at 300 bbls per day. Operators said the well was still cleaning itself and no definite information on pressures and production was available. This wildcat is miles north of the shallow Carterville producing area, discovered in 1927 and which reached a peak production of ¾ million barrels in 1930, from Buckrange sand at 2950 ft and Tokio at 3170 ft. Only a few pumpers are active at Carterville. Hunt recently temporarily abandoned Bilbray 1, section 5-23n-11w, three miles east, at 6489 ft.

Pettit lime is the producing formation in the Haynesville field in Claiborne Parish, and that formation also produces at Lisbon, and Sugar Creek, Claiborne Parish, and Shreveport, Caddo Parish. Hunt, Magnolia and Shell hold most of the acreage in the area, which is near the Arkansas border.

Morehouse Parish: Union Producing Co. abandoned its second test in the Beekman area, Crossett A-2, NE 5-22n-6e, at 3918 ft. Initial production for the discovery well, Crossett A-1, C SW NE 6-22n-6e, was a flow of 33 bbls of oil and 1,200,000 gas. Crossett A-1 drilled to 6956 ft and casing was perforated in numerous horizons.

NORTH LOUISIANA FIELD COMPLETIONS

Claiborne Parish — Haynesville: Midstates' Taylor Est. 2, 3-23n-8w, flow 144 bbls, ½-in, cp 850, tp 175, 5000 gals acid, perf 5358-70, td 5446 ft.

Midstates' Waller 5, 3-23n-8w, flow 108 bbls, 9 hrs, ¼-in, cp 500, tp 100, 5000 gals acid, perf 5570-84 ft, td 5460 ft.

Stacy's Smith 1, sw sw 4-23n-8w, flow 479 bbls, ¾-in, tp 400, 4000 gals acid, perf 5438-50, td 5550 ft.

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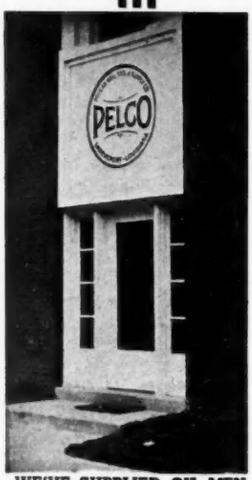

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NORTH LOUISIANA WILDCAT STARTS

Claiborne Parish: Gulf's Miller 1, c ne ne 14-20n-8w, dr.

Bienville Parish: Placid's Nebo A-1, c sw ne, 11-15n-7w, dr.

Caldwell Parish: Placid's Central-Louisiana 120, c nw sw 9-11n-3e, woc.

Natchitoches Parish: George H. Echol's Goodpine 1, c ne ne 13-13n-8w, dr.

ARKANSAS WILDCAT STARTS

Bradley County: Placid's Murphy 1, c ne se 3-16s-10w, Murphy 2, c se se 28-15s-10w, Murphy 3, c sw sw 16-17s-10w, dr.

Calhoun County: Placid's Freeman-Smith 1, c ne se 24-15s-13w, dr.

Placid's Freeman-Smith 2, c nw nw 12-15s-14w, dk.

Placid's Freeman-Smith 3, ne se 14-16s-13w, dk.

Columbia County: Roy Lee's Pickler 1, c sw ne 23-17s-21w, dr.

Southwood's Medlock 1, c se ne 12-16s-19w, dr.

Navarro's Beene 1, c se sw frac' 10-20s-20w, dr.

Nevada County: Hunt's Kirk 1, c nw se 33-12s-20w, dr.

Hunt's Stamps Land 1, c nw nw 35-14s-23w, dr.

Union County: Carter's Foyil 1 (formerly Morris 1), c nw nw 12-19s-15w, spud.

Fohs, Pilgrim and Root's Grace 1, nw se 31-17s-14w, lcn.

Marwick's Madden 1, nw sw nw 3-18s-15w, dr.

MISSISSIPPI WILDCAT COMPLETIONS

Hinds County: Plains Production Co.'s Gaddis 1, c nw ne 7-7n-3w, abnd 7510 ft.

Lincoln County: Freeport Sulphur Co.'s Board of Supervisors 1, c se se 16-5n-9e, abnd 2790 ft.

Grenada County: Adams Oil & Gas Co.'s Avent 1, c ne ne nw 26-22n-4e, abnd 4031 ft.

MISSISSIPPI WILDCAT STARTS

Issaquena County: Frontier Fuel Oil Corp.'s Mann 1, 24-11n-8w, lcn.

Simpson County: Carter's Allison 1, c sw sw 17-1n-4e, lcn.

Rocky Mountain Area

New Zone at Elk Basin Yields 80 Barrels Hour

Flowing 80 barrels per hour of 30-gravity oil, Minnelusa Oil Corporation's deep test brings in Tensleep as new zone discovery in the Elk Basin field, Wyoming.

Deep Pay at Elk Basin: Minnelusa Oil Corp. and Yale Petroleum Co.'s Henderson 1, NE NE NE 31-58n-99w, Park County, Wyoming, Elk Basin field, flowed 80 bbls per hour of 30-gravity oil, opening the Tensleep (Pennsylvanian) as a new zone. Embar topped at 4463 ft showed some saturation, Tensleep at 4488 ft, 5-in 4497 ft, td 4538 ft in saturated Tensleep. It is 1½ miles from mainly developed area of field where upwards of 11 million barrels of light oil has been produced from Frontier sands since discovery in 1915. The field connected by pipe line to Standard Oil Co. (Ind.) refinery at Greybull, Wyo. A mile south, Mackinnie Oil & Drilling Co. completed a 3,000,000-ft gas well in Cloverly. From 1500 to 2500 acres opened as potentially productive from Tensleep. Cloverly (Cretaceous) is the deepest zone drilled. Gas from this horizon at Elk Basin supplies Billings. Ohio Oil Co. has large holdings in the field. Continental Oil Co. retained equity in deep sands when several years ago made acreage trade with Midwest Refining Co. (later taken over by Stanolind) for leases in Cat Creek field, Montana. Mackinnie Oil & Drilling Co. holds 1500 acres south of Minnelusa holdings.

COLORADO WILDCAT COMPLETION

Rio Blanco County—Failure: Buford Oil Co.'s Gov't 1, c sw sw 16-1n-91w, Yellow Jacket-Buford anticline, abnd 4527 ft.

MONTANA FIELD COMPLETIONS

Glacier County—Cut Bank: A. P. Consolidated Co.'s Kiesel 7, c nw 11-34n-6w, swab 85 bbls, Lower Cut Bank 2870-84 ft, td 2892 ft, elev 3641 ft.

Consolidated Gas Co.'s Frary-Tribal 3, se nw se 34-32n-6w, swab 285 bbls, Lower Cut Bank 3056-68 ft, td 3072 ft, elev 3720 ft.

Toole County—Kevin-Sunburst: Enfield Oil Co.'s Zachor 8, cse ne 20-35n-1w, pump 25 bbls, 1560 ft.

Imperial-Craig Co.'s Causs 3, sw sw nw 18-35n-1w, swab 72 bbls, top Madison 1615 ft, td 1640 ft, pb to 1638 ft.

MONTANA FIELD COMPLETIONS

Glacier County—Cut Bank: Texas Co.'s State 12-M455, csw ne 16-32n-5w, swab 280 bbls, Lower Cut Bank 2957-70, td 2980 ft.

Toole County—Kevin-Sunburst: Black Label Oil Co.'s State 13, nw ne ne 16-35n-2w, pump 72 bbls, td 1660 ft.

MONTANA WILDCAT COMPLETION

Pondera County—Gas Discovery Conrad Butte: R. C. Tarrant's McCracken 1, cse nw 12-29n-1w, .5 gas, Colorado shale, 755 ft, elev 3709 ft.

MONTANA WILDCAT START

Wheatland County: Mid-Montana Co.'s Young 1, ne ne ne 13-7n-18e, Harle Dome, lcn.

WYOMING FIELD COMPLETIONS

Carbon County—Sherrard: Sinclair Wyoming's Carter 2, ne se sw 32-25n-88w, 4.0 gas, Lakota 2998 ft, td 3160 ft.

Niobrara County — Lance Creek: Continental's Rodeo-4 9, sw ne ne 32-26n-65w, swab 396 bbls, Basal Sundance 4127-83 ft, td 4201 ft.

WYOMING WILDCAT COMPLETION

Park County—Elk Basin, New Zone Discovery: Minnelusa Oil Corp.'s Henderson 1, ne ne ne 31-58n-99w, flow 80 bbls hr, 30-gr, 5-in set top saturated Tensleep 4497 ft, td 4358 ft.

California

Important Extensions in Kern and Los Angeles

Important extension tests in Kern and Los Angeles counties. Wildcats abandoned in Kern and Santa Barbara counties.

Kern County: Approximately a mile east of the proven limits of the Strand field, Tide Water Associated Oil Co. has completed KCL 56-8, 8-30-26, flowing 1664 bbls daily, 31-gr clean oil through a 7/16-in choke with 500 pounds pressure. Hole was bottomed at 8207 ft in silty oil sand and is producing from 87-ft interval 8100 to 8187 ft. Top of upper Stevens zone was placed at 8098 ft

Tide Water has abandoned Sterling 1, 28-30-22, McKittrick area, in gray sand and shale at 3000 ft.

Los Angeles County: Extending the Aliso Canyon field 3000 ft west, Tide Water has completed Sesnon 1, 28-3-16, flowing 2400 bbls daily, 23.9-gr oil through 48/64-in. Hole was bottomed at 9086 ft and water shutoff made at 8534 ft. Completion was in Porter 12 zone topped at 8835 ft, through considerably down-structure from other wells producing from the same zone. Gravity of oil obtained compares with 40-gr reported for completions in the developed section of the field.

Texas Co. has abandoned Buena Park 4-F-1 in the Buena Park area, 36-3-11, in shale and gray sand at 9572 ft. Poor oil sand was cored at 9320-9350 ft, and top of gray shale and gray sand entered at 9378 ft.

Santa Barbara County: Standard has abandoned Rice Ranch 1, wildcat in the Orcutt area, 14-9-34, at 9254 ft in brown shale. Miocene was topped at 9230 ft.

CALIFORNIA FIELD COMPLETIONS

Fresno County—Coalinga old field: General's Esperanza 105, 235 ft n, 322 w s¼c 6-20-15, pump 46 bbls 14-gr, 200 ft perf 1939 ft, td 2016 ft, pd 1943 ft.

Fresno County—Helm: Amerada's Weyant 35-27, 330 ft s, 1650 ew¼c 27-16-17, flow 315 bbls 30.5-gr 24/64-in, 175/850 lbs, perf 8160-8170 ft, td 8300 ft, pd 8180 ft.

Kern County—South Belridge: Belridge's No. 47-34, 1150 ft n, 2486 e swc 34-28-21,

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A symposium conducted by the Research Committee of The American Association of Petroleum Geologists, A. I. Levorsen, chairman. Papers read at the Twenty-sixth Annual Meeting of the Association, at Houston, Texas, April 1, 1941, and reprinted from the Association Bulletin, August, 1941.

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Edited by A. I. LEVORSEN

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The purpose of this symposium is to get an over-all picture of the undiscovered oil resources of North America, north of the Rio Grande. Ten geological organizations have participated, to the end that this survey has behind it the authority of many geologists representing state and national geological surveys, large and small oil companies, and consulting and independent geologists. A map and a section of geology, stratigraphy, and structure illustrate each province description.

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General's Belridge 12A, 309 ft n, 1760 e w¼c 3-29-21, pump 60 bbls 13.4-gr, 375 ft, perf 945 ft, td 960 ft.

General's Belridge 3-38, 1972 ft n, 1096 e w¼c 3-29-21, pump 49 bbls 17.5-gr, 443 ft, perf 900 ft, td 920 ft.

Kern County—Kern Front: General's Westmore 5, 1280 ft n, 250 w sec 14-28-27, pump 7 bbls 14-gr, 170 ft perf 1918 ft, td 2045 ft, td 1920 ft.

Kern County—Midway-Sunset: Richfield's Southwestern 12A, 1483 ft s, 3573 e w¼c 2-31-22, pump 100 bbls, 230 ft perf 1295 ft, td 1300 ft.

Kern County—Mount Poso: Union's S & M 35, 1140 ft n, 60 e swc 4-27-28, pump 76 bbls 15.9-gr, 70 ft perf 2023 ft, td 2024 ft.

Kern County—Round Mountain: Honolulu's No. 83, 640 ft n, 235 w e¼c 18-28-29, pump 10 bbls 26.1-gr, 340 ft perf 1778 ft, td 1780 ft.

Kern County—Williams: Shell's Williams 24-6, 2292 ft s, 1062 e nwc 6-28-20, flow 399 bbls, 23/64-in, 400/680 lbs, 178 ft perf 2345 ft, td 2350 ft.

Los Angeles County—Montebello: Standard's Baldwin 94, 739 ft s, 881 e nwc sec 1, pump 119 bbls 17.4-gr, 503 ft perf 2988 ft, td 3000 ft.

Los Angeles County—Wilmington: Long Beach Oil Dev. Co.'s W-35, 320 ft nwly n line Seaside from e side 22nd ave, thence 300 ft sely at r/a, pump, no est, 901 ft perf 3940 ft, td 3940 ft.

Long Beach Oil Dev. Co.'s W-40, 693 ft nely along n line Seaside from e side 27th ave, thence 2335 ft se at r/a, pump, no est, 460 ft perf 3580 ft, td 3774 ft.

Texas Co.'s Refinery Fee 6, 1520 ft s, 360 ft e sec Goodrich & State sts, pump 34 bbls, perf 3287-3433 ft, td 3436 ft.

Orange County—Yorba Linda: Shell's Olinda Fee 4-7-15, 2431 ft n, 362 e c/l Citrus & Eureka, pump 48 bbls 12.8-gr, 75 ft perf 1410 ft, td 1469 ft.

Ventura County—Padre Canyon-San Miguelito: Continental's Grubb 26, 190 ft s, 4170 e c sw¼ 23-30-24, flow 1175 bbls 31.7-gr, 1-in, 600/1200 lbs, 999 ft perf 7384 ft, td 7384 ft.

Ventura County—Ventura Avenue: Shell's Taylor 156, 554 ft n, 10,692 w c/l No. 11, flow 338 bbls, 10/64-in, 2200/1900 lbs, perf 8138-8459, 8539-8819, 8859-9161 ft, td 9668 ft.

CALIFORNIA WILDCAT COMPLETIONS

Kern County, Failure—McKittrick Area: Tide Water's Sterling 1, 1860 ft n, 355 w sec 28-30-22, abnd 3000 ft.

Santa Barbara County Failure—Careaga Area: Universal Consolidated Oil Co.'s Careaga 1, 5478 ft sly along e line nec Careaga ppty, thence 4225 ft wly at r/a, abnd 6123 ft.

Los Angeles County Extension—San Fernando-Aliso Canyon Area: Tide Water's Sesnon 1, 334 ft n, 5478 w Sta 84, sec 28-3-16, flow 2393 bbls 23.1-gr, 198 ft perf 9081 ft, ¾-in, 400/0 lbs, Miocene 8534 ft, Porter 12 zone 8831 ft, td 9086 ft. Extension Aliso Canyon field.

CALIFORNIA WILDCAT STARTS

Kern County: Republic's Republic-Portals 1, 2 and 3, sec 5-30-29, lcns Edison area.

Reserve Oil & Gas Co.'s 34-1, sec 34-11-19, lcn.

San Bernardino County: Supreme Oil Co.'s No. 1, sec 2-2-4, rig. Colton area.

Eastern States

WEST VIRGINIA COMPLETIONS

Boone County: Sayre Oil & Gas Co.'s Skinner & Zerkles 5, 90,000 gas, 1906 ft.

Calhoun County: Creed Yoak and H. S. Brown's McDonald 3, 10 bbls, 2087 ft.

Clay County: Pitts. & W. Va. Gas Co.'s Elk River 7869, abnd 1975 ft.

Thompson Gas Co.'s Elk River T57, abnd 2020 ft.

Gilmer County: E. L. Bush et al's Stalnaker 1, 1,000,000 gas, 1762 ft.

Harrison County: Eagle & Clay Gas Co.'s Strother 1, 100,000 gas, 2950 ft.

Jackson County: United Fuel Gas Co.'s Smith 1, 9,000,000 gas, 5274 ft.

United Fuel Gas Co.'s Bailey 1, 3,860,000 gas, 5140 ft.

United Carbon Co.'s Perkins 1065, 8,400,000 gas, 5189 ft.

Kanawha County: So. Penn Nat. Gas Co.'s Jarrett 10, 1 bbl, 1920 ft.

Godfrey L. Cabot's Poco Coal Land Co., 80,000 gas, 5029 ft.

Cameron Prod. Co.'s Hackney 1, 0.13 gas, 2183 ft.

Marion County: So. Penn Nat. Gas Co.'s Cunningham 15, 3 bbls, 3280 ft.

Putnam County: Caldwell Gas Co.'s Caldwell & Mercer 1, 130,000 gas, 2366 ft.

Buff Creek Gas Co.'s Walk 1, 100,000 gas, 2357 ft.

Ritchie County: Jones & Woodward's Marsh 1, 3 bbls, 1210 ft.

Wayne County: Chartiers Oil Co.'s Viers 3, 2 bbls, 2087 ft.

OLD WELL DRILLED DEEPER

Marshall County: Mfgrs. Light & Heat Co.'s Gray 2253, 140,000 gas, 2748 ft.

NEW YORK COMPLETIONS

Allegany County: W. J. Richardson Est.'s No. 3, Gadsby farm, Bolivar, 9 bbls, Waugh-Porter, 1450 ft.

South Bolivar Oil Co.'s McKelvey farm, Bolivar, 7 bbls, Richburg, 1372 ft.

N. V. V. Franchot Oil Co.'s Murphy farm, Bolivar, 7 bbls, Richburg, 1313 ft.

Putnam Oil Co.'s Birtoil farm, Wirt, 8 bbls, Richburg, 1436 ft.

Ebenezer Oil Co.'s Emerson farm, Scio, 8 bbls, 1155 ft.

Messer Oil Corp.'s "M" Allen farm, Alma, 7 bbls, Richburg, 1379 ft.

Messer Oil Co.'s Koehler farm, Clarksville, 6 bbls, Richburg, 1329 ft.

F. J. Wilson's Burdick farm, Wirt, 8 bbls, Wirt, 1352 ft.

Messer Oil Co.'s Buena Vista farm, Wellsville, 8 bbls, Scio, 1042 ft.

Bradley Prod. Corp.'s Allen farm, Alma, 6 bbls, Richburg, 1359 ft.

Otsquago Corp.'s Pike farm, Alma, 8 bbls, Richburg, 1358 ft.

J. P. Herrick's No. 1, David Howe farm, Bolivar, 7 bbls, Richburg, 1429 ft.

Max Andrews' Clair farm, Wirt, 6 bbls, Richburg, 1340 ft.

Floyd Oil Co.'s Briggs farm, Wellsville, 5 bbls, Fulmer, 1269 ft.

Scio Oil & Gas Co.'s Clark farm, Scio, 8 bbls, Scio, 780 ft.

Deer Creek Oil Co.'s Hall farm, Genesee, 6 bbls, Richburg, 1355 ft.

I. & H. Oil Co.'s Sawyer farm, Wirt, 5 bbls, Richburg, 1337 ft.

Bradley Prod. Corp.'s Smith-Gray farm, Clarksville, 7 bbls, 1359 ft.

H. W. Patterson et al's Browning farm, Scio, 5 bbls, 733 ft.

Tompkins County: N. Y. State Natural Gas Co.'s Frank Stoddard 1, abnd 2166 ft.

NEW YORK INTAKE WELLS

Allegany County: South Bolivar Oil Co.'s McKelvey farm, Bolivar, Richburg, 1335 ft.

Putnam Oil Co.'s Birtoil farm, Wirt, Richburg, 1419 ft.

Otsquago Corp.'s Reid farm, Alma, Richburg, 1384 ft.

Trio Oil Co.'s Wetherby farm, Bolivar, Richburg, 1371 ft.

L. H. Thornton et al's Fassett farm, Willing, 1249 ft.

Bliven Hill Oil Co.'s Norton-McEwen-Smith farm, Amity, Scio, 956 ft.

H. W. Patterson et al's Black farm, Scio, Scio, 835 ft.

Martin Bros. Oil Co.'s Daggett Hollow lease, Genesee, Richburg, 1324 ft.

OHIO COMPLETIONS

Athens County: C. A. Cody's McLeod 1, 400,000 gas, 1148 ft.

Guernsey County: Ohio Fuel Gas Co.'s Jackson 1, 670,000 gas, 3480 ft.

Hocking County: Ohio Fuel Gas' Sunday Creek Coal Co. 215, abnd 1079 ft.

Holmes County: Kenrow Co.'s O'Hall 1, abnd 3642 ft.

Knox County: Allen, Willey et al's Staats 1, 200,000 gas, 2965 ft.

Joe Ake's Stricker 2, 60,000 gas, 3110 ft.

Licking County: Penick et al's Lynn 10, abnd 2602 ft.

Davis Hazlett's Claggett 1, abnd 3146 ft.

Loraine County: Ohio Fuel's Kundtz 1, 650,000 gas, 2737 ft.

Medina County: Ohio Fuel's Lyons 1, 2,000,000 gas, 3580 ft.

Meigs County: H. M. Nelson's Nelson 1, abnd, 750 ft.

Monroe County: Peters et al's Ankram 2, 25 bbls oil, 100,000 gas, 1110 ft.

Morgan County: Jess Williams' Hammond 1, abnd, 835 ft.

Industrial Gas' Souders 1, abnd 4282 ft.

Muskingum County: Industrial Gas Corp.'s Lienthal 4, 25 bbls, 4494 ft.

Noble County: Clymer et al's Lincicome 1, 30,000 gas, 1606 ft.

Perry County: Palm Oil Corp.'s Long 2, 95 bbls, 2738 ft.

Preston's Helser 1, abnd 2794 ft.

Preston's Holdein 1, abnd 3250 ft.

Preston's Keffer 1, 28 bbls, 3409 ft.

Tuscarawas County: Nat. Gas. of W. Va.'s Hazlett 1, 1,200,000 gas, 4788 ft.

Washington County: Perdew et al's Perdew 1, abnd 1481 ft.

Healey et al's Martin 1, 560,000 gas, 1231 ft.

Wayne County: Ohio Fuel's Knox 1, abnd 2943 ft.

Wyandot County: Dibble & Miller's Parcell 1, abnd 3475 ft.

PENNSYLVANIA COMPLETIONS

Armstrong County: Wray Sedgwick & Crum's Neese 1, 1,500,000 gas, 894 ft.

Peoples Natural Gas Co.'s Schaeffer 1, abnd 2966 ft.

Clarion County: Owens, Illinois Glass Co.'s Wallwork 1, 0.03 gas, 3277 ft.

Fayette County: Brumage et al's Lavaca 1, abnd 1904 ft.

Greene County: Mfgrs. Light & Heat Co.'s Bailey 1, 90,000 gas, 3361 ft.

Washington County: Union Gasoline & Oil Corp.'s Craft 6, 170,000 gas, 2625 ft.

Men in the Industry's News

BURDETTE BLUE, Tulsa, has been elected president of the Kansas-Oklahoma Division of the Mid-Continent Oil & Gas Association for 1943. L. G. Owen, Carter Oil Company, Tulsa, was elected first vice president. Other officers include E. B. Sawyer, Wichita, vice president for Western Kansas; Carl Weiner, Chanute, vice president for Eastern Kansas; A. W. Ambrose, Cities Service Oil Company, Bartlesville, vice president for Northern Oklahoma; Lloyd Noble, Noble Drilling Corporation, Ardmore, vice president for Southern Oklahoma, and W. R. Wallace, Magnolia Petroleum Company, Oklahoma City, vice president for Western Oklahoma. Carel B. Mapes, of Tulsa, continues as secretary-treasurer.

HUGH MATIER, in charge of public relations for Union Oil Company, was main speaker before the Los Angeles Chapter of Nomads recently. He spoke on "Alaska, the New Frontier." The speaker envisioned a glowing picture of post-war possibilities in Alaska and reminded the chapter that the highway linking the United States and Alaska was one link in the road extending from North to South America.

A number of guests were present at the Nomads meeting and among them were the following from other countries: B. R. Cunningham from Venezuela; Frank McAtier who was formerly with the Burmah Oil Company; Meade McCamey; J. C. Vandenberg; Sanford Hall of Burmah Oil Company; E. B. Udlock of Standard Oil Company of Venezuela; W. F. Parraga; John Bryde of Cia Shell de Colombia; and Homer LeFlor of Socony-Vacuum Oil Company of Venezuela.

B. F. GILCHRIST, pipe line superintendent for Bell Oil & Gas Company with headquarters at Burkburnett, has resigned to become production superintendent for Whitaker Oil Company, recently organized Fort Worth concern that is engaged in a drilling program in North and West Texas. Dale Cropper, former manager of Burkburnett district office of Bell Oil & Gas Company, has been given a similar position with Whitaker Oil Company.

R. E. KING, member of Shell Oil Company's geological staff in West Texas the past six years, has resigned to take charge of surface geology operations of Superior Oil Company of California in the Permian Basin with headquarters at Roswell, New Mexico. R. R. Wheeler, geologist for Shell since last January, will be assistant to King.

HUGH D. McCULLOUGH, Midland, Texas, geologist for Sinclair Prairie Oil Company, has resigned to enter the service of the Federal Bureau of Investigation upon the completion of a training course at Washington.

J. W. LIDDELL, manager of railway sales for Continental Oil Company, Chicago, has moved to Washington, where he has been assigned to special duty on the staff of Major J. R. Parten, director of the transportation division in the Office of the Petroleum Coordinator for War. While on leave of absence for the duration, Liddell's railway sales activities for Continental Oil Company will be handled by E. F. Shannon, assistant manager of the division. Liddell has been associated with Continental Oil Company for more than 18 years, having started May 5, 1924, as traffic manager for Texhoma Oil & Refining Company at Wichita Falls, Texas. Following several promotions, he was appointed manager of the railway sales division in January, 1941.

ROBERT WILSON, North Texas scout for Sun Oil Company, has been transferred from Gainesvile to Tyler, where he will cover production and pipe-line activities in the East Texas district.

PHIL YECKEL, employe of Midland, Texas, branch of Carl B. King Drilling Company, the past five years, has been commissioned a first lieutenant in the Marine Corps.

C. L. MOHR, geologist for Ambassador Oil Corporation, Fort Worth, has resigned to join the United Geophysical Company of Pasadena, California, for duty in Chile. The geophysical company has contract to conduct oil exploratory operations for the Chilean government.

PAUL L. APPLIN, Fort Worth consulting geologist, and former head of the geological department of the J. S. Cosden interests, has been appointed chief geologist for Danciger Oil & Refineries, Inc. He succeeds R. R. Thompson, who recently resigned to accept similar position with Snowden & McSweeney Company, Fort Worth.

J. E. (JACK) FLANAGAN, who served The Texas Company in the land department for more than 25 years, retired from active duty December 1. He was the company's landman for Oklahoma, Kansas, Illinois, and Indiana.

Flanagan came to Oklahoma from Pennsylvania in 1910, where he worked a year for the Donnelly Oil & Gas Company. Persuaded to return to Pennsylvania by his former employers, the lure of the oil business was too great and in 1912 he returned to Oklahoma to stay. This time he went into the oil business for himself, buying a lease in the Bird Creek area on which there was only one well. After drilling eight more producers on the lease, he sold out. The Texas Company purchased the oil from his lease and in preparing the transfer papers, he became acquainted with the late Martin Moran. Moran apparently was impressed by Flanagan's personality and referred him to Mike Connors, then division manager for Producers Oil Company, at that time the producing sub-

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sidiary of The Texas Company. He was employed by Producers Oil Company on January 1, 1917, as a scout. His entry into the service of Producers Oil Company was at the time when the oil business was undergoing its transition from the horse and buggy days and he was assigned one of the first model "T" Fords the company purchased. After scouting a year, he was made a lease man and was given charge of the land department November 1, 1919, and has continued in that position until retirement.

One of the most spectacular phases of his career has been his participation in the Osage lease sales. Flanagan, as the representative of The Texas Company, has attended all of the important Osage sales and has probably paid the Osage Indians more bonus money than any other one man.

O. W. MORGAN has been appointed manager of the New York export office, Graybar Building, of the Oil Tool Division of Byron Jackson Company. He has been associated with the division for several years in California, Oklahoma, Texas, Louisiana, Kansas and Illinois. The company also announced the appointment of S. F. Remmel as representative of the Oil Tool Division in Washington, D. C., Brighton Hotel. Remmel was sales manager in California.

C. M. RADER has been appointed assistant general manager, and H. K. Browning, general sales manager, according to announcement by J. C. Coberly, president and general manager of Kobe, Inc. These changes were made in order to meet increasing demands of the company's business due to its war contracts and rapidly spreading use of the company's hydraulic pumping system, which is used for the production of crude oil.

Rader, formerly general sales manager, will as assistant general manager be responsible for all hydraulic pump and perforated pipe activities of the company, and will continue his headquarters in Huntington Park, California. Rader was graduated from the University of Minnesota's school of civil engineering and immediately entered the officer's training course at Fort Snelling, Minnesota, and served in France during 1917 and 1918. In 1920, he joined Mid-West Refining Company and served as district petroleum engineer in Wyoming, Montana and Colorado. After a brief experience in general engineering in Florida in 1925, he joined Indian Territory Illuminating Oil Company as petroleum engineer at Seminole — later moving to Oklahoma City as assistant to the vice president and general manager of the company. In 1931 he went with Phillips Petroleum Company in Oklahoma City as petroleum engineer when the Oklahoma City field was presenting its first of many difficult production problems. In 1937 Rader joined Kobe, Incorporated, as Mid-Continent division manager which position he held until April of this year when he was made general sales manager and moved to Huntington Park.

Browning as general sales manager will have charge of all the company's sales, field and advertising activities in both the domestic and foreign markets for all products, and will headquarter in Huntington Park.

After attending the school of civil engineering at Cornell University, Browning joined A. M. Byers Company of Pittsburgh as manager of oil country sales. Interest in pumping and corrosion problems caused his association in 1934 with the S. M. Jones Company as sales manager, a position he held for five years.

Browning joined Kobe, Incorporated, in 1940 as division sales manager and in April of this year replaced Rader as Mid-Continent division manager on the latter's transfer to Huntington Park as general sales manager.

C. M. RADER

H. K. BROWNING

G. J. TURNER heads the staff of a newly opened office of Phillips Petroleum Company in Ponca City.

KENNETH ALLEN JOHNSTON, geologist and geophysicist, died at Los Angeles November 13, following an abdominal operation. He received his A.B. in geology, cum laude, from the University of Colorado in June, 1925, and subsequently was geologist and geophysicist for Midwest Refining Company, The Texas Company, the Geo. F. Getty Company. For the past 17 years he was connected with Buttes Oilfields, Ltd., Oakland, California, and discovered for that company the first commercial gas field in northern California at Marysville Buttes, Marysville, California. He had been an active member of the American Association of Petroleum Geologists since 1928.

WELBORN B. CRUTCHER, 47, Shawnee, Oklahoma, died Sunday, November 30. Crutcher had been in charge of production for Carter Oil Company in Kansas and Oklahoma as division superintendent. A native of Marshall, Missouri, he graduated from Missouri School of Mines and was employed by J. F. Martin and Company, engaged in oil field construction in Tampico, Mexico. In 1929, he entered the employ of Carter Oil Company at Seminole.

Squeaks from the Bull Wheel

Conference

The following has been sent to THE OIL WEEKLY as a contribution from an anonymous oil man, composed while en route home from a "conference."

Definition of a "Conference"

A meeting of two or more otherwise intelligent folks where the purpose of each conferee is to say what he thinks to the other or others. Nobody hears or cares what the other fellow has to say as each person is too busy figuring out the more important speech he is going to make when he gets the floor. The strategy of getting the floor is important and this coupled with the noise of the speaking precludes the possibility of thoughtfulness entering into the contest. The last speech, relating to adjustment, is poorly delivered, yet, due to its unique spot on the program, is unanimously received.

So Sorry

A story that might help to end all absent-minded professor stories concerns the absent-minded professor who walked into the barber shop. He sat himself next to a pretty red head who was having her hair bobbed at the moment.

"Haircut, please," ordered the professor.

"Certainly," said the barber. "But, if you really want a haircut, would you mind taking your hat off first?"

The absent-minded professor hurriedly removed his hat.

"Oh, I'm terribly sorry," he apologized, as he looked around. "I didn't know there was a lady present."

Sailor Talk

"The girls run after my kisses."

"So what? After mine they limp."

Explained

"I don't see Charlie nearly as much as I used to."

"Well, you should have married him when he wanted you to."

"I did."

Deciding Factor

"My dear, I never imagined you would marry the man you did."

"Neither did I, my dear. I simply hated his ways, but I adored his means."

American Beauty?

Much of the success of the flower show had been due to Smith, who'd organized it all, and, being an ardent horticulturist, had won quite a few prizes.

Later on, he was reading the report in the local paper when he jumped to his feet, with an angry bellow.

"Why, what's wrong?" asked Mrs. Smith, dropping her knitting at the outburst.

"Listen to this!" he roared. "It says here: 'As Mr. Smith mounted the platform to open the show, all eyes were fixed on the large red nose he displayed. Only years of careful cultivation could have produced an exhibit of such brilliance.'"

Ready for the Ordeal

"Are the irons hot?"

"As hot as I can get them."

"Is the oil boiling?"

"Yes."

"Is the victim securely fastened in the chair?"

"Yes. She cannot move."

"O.K. then. Give her the $2 permanent."

Ferocious

"What's that ugly insignia on the side of the ship?"

"Sh-h-h-h. That's the commanding officer looking out of the port hole."

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Whether they be managers, superintendents, or engineers, these men are essentially specialists. Their decisions must be right and their follow-through effective. Their problems are specific and peculiar to the job at hand, and they have no time for generalities. Their thinking and action must be shorn of all lost motion. And those who would sell or serve them must align themselves accordingly.

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York Oilfield Supply Co. —
The Youngstown Sheet & Tube Co. —

A WILDCAT GOES WILD!

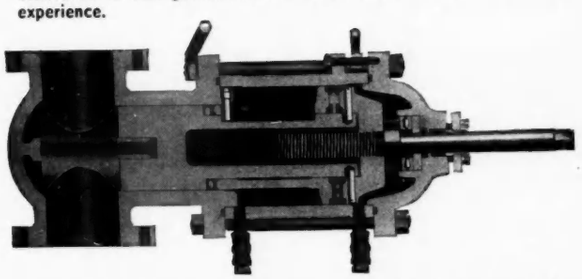
A wildcat well in Southern Louisiana, soon after blowing out on October 6, 1942, and catching fire. The blaze was extinguished 2 weeks later by M. M. Kinley Company, wild well operators.

Below — Cameron special built capping manifold being lowered to position over the high pressure well flow. Note gas fog and flow through Cameron valve.

Capping manifold being bolted securely to the flange of a Cameron casing head previously snubbed down over the 7" casing in the well.

AND AGAIN CAMERON'S PRESSURE-OPERATED GATE VALVE WRITES "FINIS" TO THE CAREER OF ANOTHER WILD WELL!

Extensive and versatile shop facilities, together with the World's best pressure control equipment and men experienced in designing and fabricating special manifolds quickly, are indispensable factors in wild well operations. Cameron invites operators who require assistance in emergencies to make full use of its facilities and experience.



CAMERON IRON WORKS, INC.

711 MILBY ST., HOUSTON, TEXAS

Export: 74 Trinity Place, New York, N. Y.
California: The Howard Supply Co., Los Angeles
Rocky Mountain: Mountain Sales and Service, Casper, Wyo.

27 days after blowing out, the Cameron pressure-operated gate valve is closed. The weary crew smiles and poses for a photograph.

sidiary of The Texas Company. He was employed by Producers Oil Company on January 1, 1917, as a scout. His entry into the service of Producers Oil Company was at the time when the oil business was undergoing its transition from the horse and buggy days and he was assigned one of the first model "T" Fords the company purchased. After scouting a year, he was made a lease man and was given charge of the land department November 1, 1919, and has continued in that position until retirement.

One of the most spectacular phases of his career has been his participation in the Osage lease sales. Flanagan, as the representative of The Texas Company, has attended all of the important Osage sales and has probably paid the Osage Indians more bonus money than any other one man.

O. W. MORGAN has been appointed manager of the New York export office, Graybar Building, of the Oil Tool Division of Byron Jackson Company. He has been associated with the division for several years in California, Oklahoma, Texas, Louisiana, Kansas and Illinois. The company also announced the appointment of S. F. Remmel as representative of the Oil Tool Division in Washington, D. C., Brighton Hotel. Remmel was sales manager in California.

C. M. RADER has been appointed assistant general manager, and H. K. Browning, general sales manager, according to announcement by J. C. Coberly, president and general manager of Kobe, Inc. These changes were made in order to meet increasing demands of the company's business due to its war contracts and rapidly spreading use of the company's hydraulic pumping system, which is used for the production of crude oil.

Rader, formerly general sales manager, will as assistant general manager be responsible for all hydraulic pump and perforated pipe activities of the company, and will continue his headquarters in Huntington Park, California. Rader was graduated from the University of Minnesota's school of civil engineering and immediately entered the officer's training course at Fort Snelling, Minnesota, and served in France during 1917 and 1918. In 1920, he joined Mid-West Refining Company and served as district petroleum engineer in Wyoming, Montana and Colorado. After a brief experience in general engineering in Florida in 1925, he joined Indian Territory Illuminating Oil Company as petroleum engineer at Seminole — later moving to Oklahoma City as assistant to the vice president and general manager of the company. In 1931 he went with Phillips Petroleum Company in Oklahoma City as petroleum engineer when the Oklahoma City field was presenting its first of many difficult production problems. In 1937 Rader joined Kobe, Incorporated, as Mid-Continent division manager which position he held until April of this year when he was made general sales manager and moved to Huntington Park.

Browning as general sales manager will have charge of all the company's sales, field and advertising activities in both the domestic and foreign markets for all products, and will headquarter in Huntington Park.

After attending the school of civil engineering at Cornell University, Browning joined A. M. Byers Company of Pittsburgh as manager of oil country sales. Interest in pumping and corrosion problems caused his association in 1934 with the S. M. Jones Company as sales manager, a position he held for five years.

Browning joined Kobe, Incorporated, in 1940 as division sales manager and in April of this year replaced Rader as Mid-Continent division manager on the latter's transfer to Huntington Park as general sales manager.

C. M. RADER

H. K. BROWNING

G. J. TURNER heads the staff of a newly opened office of Phillips Petroleum Company in Ponca City.

KENNETH ALLEN JOHNSTON, geologist and geophysicist, died at Los Angeles November 13, following an abdominal operation. He received his A.B. in geology, cum laude, from the University of Colorado in June, 1925, and subsequently was geologist and geophysicist for Midwest Refining Company, The Texas Company, the Geo. F. Getty Company. For the past 17 years he was connected with Buttes Oilfields, Ltd., Oakland, California, and discovered for that company the first commercial gas field in northern California at Marysville Buttes, Marysville, California. He had been an active member of the American Association of Petroleum Geologists since 1928.

WELBORN B. CRUTCHER, 47, Shawnee, Oklahoma, died Sunday, November 30. Crutcher had been in charge of production for Carter Oil Company in Kansas and Oklahoma as division superintendent. A native of Marshall, Missouri, he graduated from Missouri School of Mines and was employed by J. F. Martin and Company, engaged in oil field construction in Tampico, Mexico. In 1929, he entered the employ of Carter Oil Company at Seminole.

Squeaks from the Bull Wheel

Conference

The following has been sent to THE OIL WEEKLY as a contribution from an anonymous oil man, composed while en route home from a "conference."

Definition of a "Conference"

A meeting of two or more otherwise intelligent folks where the purpose of each conferee is to say what he thinks to the other or others. Nobody hears or cares what the other fellow has to say as each person is too busy figuring out the more important speech he is going to make when he gets the floor. The strategy of getting the floor is important and this coupled with the noise of the speaking precludes the possibility of thoughtfulness entering into the contest. The last speech, relating to adjustment, is poorly delivered, yet, due to its unique spot on the program, is unanimously received.

So Sorry

A story that might help to end all absent-minded professor stories concerns the absent-minded professor who walked into the barber shop. He sat himself next to a pretty red head who was having her hair bobbed at the moment.

"Haircut, please," ordered the professor.

"Certainly," said the barber. "But, if you really want a haircut, would you mind taking your hat off first?"

The absent-minded professor hurriedly removed his hat.

"Oh, I'm terribly sorry," he apologized, as he looked around. "I didn't know there was a lady present."

Sailor Talk

"The girls run after my kisses."

"So what? After mine they limp."

Explained

"I don't see Charlie nearly as much as I used to."

"Well, you should have married him when he wanted you to."

"I did."

Deciding Factor

"My dear, I never imagined you would marry the man you did."

"Neither did I, my dear. I simply hated his ways, but I adored his means."

American Beauty?

Much of the success of the flower show had been due to Smith, who'd organized it all, and, being an ardent horticulturist, had won quite a few prizes.

Later on, he was reading the report in the local paper when he jumped to his feet, with an angry bellow.

"Why, what's wrong?" asked Mrs. Smith, dropping her knitting at the outburst.

"Listen to this!" he roared. "It says here: 'As Mr. Smith mounted the platform to open the show, all eyes were fixed on the large red nose he displayed. Only years of careful cultivation could have produced an exhibit of such brilliance.'"

Ready for the Ordeal

"Are the irons hot?"

"As hot as I can get them."

"Is the oil boiling?"

"Yes."

"Is the victim securely fastened in the chair?"

"Yes. She cannot move."

"O.K. then. Give her the $2 permanent."

Ferocious

"What's that ugly insignia on the side of the ship?"

"Sh-h-h-h. That's the commanding officer looking out of the port hole."